BY ORDER OF THE COMMANDER
AIR EDUCATION AND TRAINING COMMAND

AETC INSTRUCTION 11-208

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Flying Operations

SPECIALIZED UNDERGRADUATE PILOT TRAINING – HELICOPTER (SUPT-H)

COMPLIANCE WITH THIS PUBLICATION IS MANDATORY

OPR: HQ AETC/DOFS
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This instruction implements AFPD 11-2, *Aircraft Rules and Procedures*, and a US Air Force-US Army Aviation Center (USAAVNC) memorandum of agreement (MOA). It establishes policy and guidance for the training, administration, and support of SUPT-H. It further delineates and clarifies conflicting guidance provided in Air Force instructions and Army regulations due to the unique nature of SUPT-H. This instruction applies to the 23d Flying Training Squadron (23 FTS) and USAAVNC agencies involved in the training, administration, and support of US Air Force helicopter flight students. It also applies to members of the Air National Guard and Air Force Reserve Command who are enrolled in flying courses. ***NOTE:*** When referenced in this instruction, the terms "students," "instructor pilots (IP)," and "flight examiners (FE)" refer to Air Force personnel unless specifically stated otherwise.

Submit suggested improvements to this instruction via AF Form 847, **Recommendation for Change of Publication,** through stan/eval channels, to HQ AETC/DOF, 1 F Street Suite 2, Randolph AFB TX 78150-4325. Waiver authority is HQ AETC/DO unless otherwise noted. Maintain and dispose of records created as a result of processes prescribed in this publication in accordance with AFMAN 37-139, *Records Disposition Schedule.* See Attachment 1 for a glossary of references and supporting information.

Chapter 1

GENERAL GUIDELINES AND AIRCREW TRAINING

Section 1A—General Guidelines

1.1. Control. The Air Force exercises operational and administrative control over SUPT-H students.

1.2. Guidance. Unique in its mission, the 23 FTS uses Army assets to implement unique Air Force undergraduate helicopter training. All 23 FTS operations will be conducted in accordance with (IAW) Air Force directives except where noted. Personnel in the 23 FTS (students and permanent party) will follow Army flying rules while enrolled in or instructing the Initial Entry Rotary Wing (IERW), Rotary Wing Qualification Course (RWQC), or Method of Instruction (MOI). Chapters 1, 2, and 3 of this instruction will serve as "AFI 11-2 mission design series (MDS)-specific series" guidance. Changes to Chapter 1, Section 1A, of this instruction will be coordinated through both Air Force and Army channels. The rest of this instruction may be changed or revised through Air Force channels alone.

1.3. Rotary Wing Qualification Course (RWQC):

1.3.1. Monitoring. Rated Air Force personnel may monitor any student training flight as additional crewmembers IAW AFI 11-401/AETC Sup 1, *Flight Management*. Air Force personnel may monitor any academic lesson.

1.3.2. Student-Instructor Ratio. The maximum student-instructor ratio in RWQC will be 2:1.

1.3.3. Guest Instructing. As determined by the 23 FTS/CC, 23 FTS IPs may guest-instruct Air Force students in RWQC and MOI. Requests by the Aviation Training Brigade (ATB) to provide manning assistance will be forwarded to the 23 FTS/DO for approval. The 23 FTS/DO will ensure IPs are current and qualified in the applicable phase of training before authorizing guest instruction.

1.3.4. Student Flight Evaluations. Flight examiners (FE) will administer RWQC and MOI evaluations to Air Force students in the 23 FTS.

1.4. Air Force Unique (AFU). Only 23 FTS IPs and FEs and will instruct and/or evaluate AFU students. Students in AFU will use the 23 FTS Flight Crew Checklist Training Aid (on the 23 FTS server) for preflight and checklist operations. This checklist will be maintained by 23 FTS/DOV, and all changes must be approved by 19 AF/DOS.

1.5. Local Flying Area. The local flying area is defined in USAAVNC Regulation 95-2, *Directory of Aviation Training Facilities and Procedures*. Requests for flights outside the local flying area will be considered and coordinated IAW local procedures.

1.6. Written Examination Standards. Air Force students must achieve 85 percent on written examinations during all phases of training (to include RWQC). Syllabus procedures will be followed for a failure. For RWQC, failure to achieve an 85 percent will result in a complete retest, which cannot be accomplished on the same day. Go/no-go criteria for individual blocks will not be pass/fail, only the overall score.

1.7. Flight Scheduling:

1.7.1. For RWQC and MOI, end-of-phase flight evaluations will be scheduled when the student is deemed ready by the dedicated instructor or class commander, as appropriate.

1.7.2. After the successful completion of an end-of-phase flight evaluation, students are not required to fly remaining syllabus time for that phase.

1.7.3. To facilitate ontime graduation, synthetic flight training simulator schedulers (ATZQ-ATB-TD) will ensure AFU simulator training maintains the highest student scheduling priority.

1.8. Physical Training. Students will participate in a physical training program IAW AETCI 36-2205, *Formal Aircrew Training Administration and Management.*

1.9. Unsatisfactory Performance. Unsatisfactory student performance processes will be administered IAW applicable publications (for example, applicable syllabus of instruction, AETCI 36-2205). These processes are comparable to USAAVNC student review boards and elimination procedures. The 23 FTS/CC will notify the ATB commander of any review boards or elimination procedures against Air Force student pilots.

1.10. Instructor Qualification. Any Air Force rotary-wing qualified instructor meets the basic prerequisite to serve as an SUPT-H instructor. Qualification procedures for SUPT-H instructors will be IAW Section 1B of this instruction. Completion of Phase 1 (Section 1B) is the only prerequisite for MOI. Air Force IPs will only attend the contact portion of MOI.

1.11. Flying Currency. The only currency requirements for 23 FTS pilots are listed in Section 1B.

1.12. Standardization/Evaluation. The 23 FTS will comply with AFI 11-202, Volume 2, *Aircrew Standardization/Evaluation Program,* and Chapters 1 through 3 of this instruction. The 23 FTS will maintain individual flight evaluation folders (FEF) for Air Force permanent party aircrew. (The 23 FTS will not maintain Army individual aircrew training folders.)

1.13. Administrative Procedures:

1.13.1. Flight Records. The Tyndall AFB host aviation resource management (HARM) office will maintain flight records for 23 FTS personnel.

1.13.2. Flight Equipment Issue. The central issue facility will provide replacement flight equipment to 23 FTS personnel and students as required. The 23 FTS Supply Office will provide all other required equipment.

1.13.3. Textbook Issue. The textbook issue facility (ATZQ-TDS-O) will issue students RWQC and MOI publications during inprocessing.

1.13.4. Publications Distribution. The 23 FTS will provide a list of required Army publications to the directorate of information management (DOIM). DOIM will immediately notify the 23 FTS upon receipt of new issues, changes, or supplements. The 23 FTS will notify the 58 Operations Group Stan/Evan (OG/OGV) of any changes.

1.14. Medical Requirements:

1.14.1. A copy of physical examinations performed on rated pilots or students will be forwarded to 325 OSS/OSOF, 1141 Florida Ave, Suite 12, Tyndall AFB FL 32403-5213. Another copy will be forwarded to ATZQ-DPT-RT, DAS, SSB Flight Records, Bldg 5700, Andrews Ave, Ft Rucker AL 36362-5358.

1.14.2. A recommendation to medically disqualify a rated pilot or student from flying duty must be approved by HQ AETC/SGPS. A waiver of a disqualifying condition by a US Air Force medical authority will be the authority to return the individual to flying duty.

1.14.3. US Army or US Air Force flight surgeons will provide medical care for personnel on flying status. The use of physician extenders is not authorized.

1.14.4. A Flying Class II physical may be conducted by a flight surgeon from either the US Army Aeromedical Center (USAAMC) or a US Air Force flight surgeon's office. Medical standards will be

IAW AFI 48-123, *Medical Examinations and Standards*. The examination will be valid until the last day of the aviator's birth month, and it may be taken anytime during the 3-month period prior to that date.

1.14.5. DA Form 4186, **Medical Recommendation for Flying Duty,** or AF Form 1042, **Medical Recommendations for Flying or Special Operational Duty,** as applicable, will be completed by the flight surgeon at the time of the flight physical and hand-carried by the pilot to the 23 FTS/CC's support staff. One copy each will be sent to the Tyndall AFB HARM office, the MOI flight commander (if the pilot is attending MOI, and the pilot.

1.14.6. Students will report to the USAAMC prior to Training Day 1. A flight surgeon will issue a DA Form 4186 at the time of inprocessing if the student has been previously certified and no intervening medical history prohibits flying duty.

1.14.7. The report of medical examination certified by HQ AETC/SGPS or HQ USAF/SGPA at the time of entry into flying training will be used for the purpose of rating and placement on flying status. A student's flight physical will remain valid, and the expiration date will be extended until his or her first birth month following graduation from initial upgrade training (AFI 48-123).

1.15. Safety:

1.15.1. Program Participation and Compliance. The 23 FTS will comply with Air Force squadron-level safety programs. The aviation branch safety office (ABSO) products and programs will be made available to the 23 FTS to supplement its program. Where a suitable Army substitute does not exist, the 58 SOW/SE will comply with Air Force wing-level safety programs.

1.15.2. Mishap Notification. USAAVNC notifies the 23 FTS/CC, DO, and SE when any Air Force personnel are involved in any mishap and provides update information as it becomes available. The ABSO will include 23 FTS/CC, DO, and SE in all notifications and reports of aircraft mishaps involving Air Force personnel. The 23 FTS will forward these notifications and reports to 58 SOW/SE.

1.15.3. Joint Service Safety Investigations. For a joint service mishap, a "Memorandum of Understanding for Safety Investigation and Reporting of Joint Service Mishaps," 24 May 2001, maintained by 58 SOW/XP, will be activated. A joint service mishap is defined as "an incident involving two or more services in which one or more service(s) experience reportable injuries or damage, or involving joint programs where only one service experiences a loss and two or more services are/were involved in development and acquisition of a system."

1.16. Landing Zone (LZ), Routes, and Local Training Area Inspections. The safety offices of the 1st Battalion, 212th Aviation Regiment (1/212 AVN), and the 1st Battalion, 223 Regiment (1/223 AVN), Ft Rucker AL, will send 23 FTS/SE the periodic inspections performed on LZs, training routes, and the local training areas. Noise avoidance and no-fly area information will also be included in these reports.

Section 1B—Aircrew Training

1.17. General Information. This chapter outlines ground and flying training requirements for H-1 IPs assigned or attached to the 23 FTS. It establishes minimum requirements for qualification and training of IPs.

1.18. Responsibilities:

1.18.1. All aircrew training should be completed with minimum interruption and in the prescribed sequence. Exceptions to training sequence must be approved by the 23 FTS/CC, DO, and ADO and documented in the training folder.

1.18.2. The 23 FTS/DO or designated training supervisor will implement the provisions of this chapter.

1.19. Training Records and Report:

1.19.1. Pilot training records will be established, maintained, and disposed of IAW AFI 11-202 volumes, AFMAN 37-139, and AETCI 36-2205.

1.19.2. A training folder will be initiated for initial qualification, requalification, mission upgrade training, or upgrade to next higher crew qualification (except for MOI). Multiple qualifications may be combined in one training folder.

1.19.3. If corrective action is required as a result of a Q-3 evaluation, a training folder will be initiated (unless one has already been initiated). This requirement may be waived by the 23 FTS/DO if corrective action is limited and would not warrant initiation of a training folder. If a training folder is used, the FE who evaluated the pilot will enter comments pertaining to the training deficiency.

1.19.4. Active training records must be maintained at a location readily accessible to instructors, supervisory personnel, and the pilot in training.

1.19.5. The 23 FTS/DO or ADO will review open records at least monthly. The monthly review will evaluate training effectiveness, scheduling effectiveness, and student progress. All reviews and comments will be entered on the 19 AF Form 13, **Aircrew Training Comments Record,** and signed and dated by the reviewer.

1.20. In-Flight Supervision. Pilots who are unqualified in an event or mission area or who are in a training program (upgrade, certification, corrective action, duty familiarization, etc.) must fly under the supervision of an IP. The IP must be at a set of controls and must be current and qualified in the events being trained.

1.21. Inprocessing Requirements:

1.21.1. Fire Extinguisher Training. Refer to AFI 91-301, *Air Force Occupational and Environmental Safety, Fire Protection, and Health (AFOSH) Program.* Training must be accomplished within 30 days of reporting for duty. In addition to AFOSH fire extinguisher training, aircrews will be trained on aircraft fire extinguishers and how to use them during flight or hot refueling.

1.21.2. Marshaling Exam. Refer to AFI 11-218, *Aircraft Operation and Movement on the Ground*. The written exam will be completed and training will be accomplished within 30 days of reporting for duty.

1.21.3. Mast Bumping Training. View the US Army videotape “Mast Bumping, Causes and Prevention,” #TF46-6077, or a computer-aided training equivalent.

1.22. Qualification Training. Prerequisite flight time for attending SUPT-H pilot instructor training (PIT) will be a minimum of 500 hours total helicopter time and prior instructor qualification in another rotary-wing MDS. (***NOTE:*** Current Phase 1, 2, and 3 training programs will remain in use until the UH-1H PIT syllabus is released.) SUPT-H PIT will consist of three phases of training, as follows:

1.22.1. Initial Qualification Training (IQT), Phase 1. IQT will follow an Air Force syllabus of instruction and be taught by Air Force instructors. Training will include all maneuvers required for a qualification evaluation according to Chapter 2 of this instruction. By completion of the course, IQT will be completed with a qualification evaluation to include requisites according to AFI 11-202, Volume 2, and Chapter 2 of this instruction. ***NOTE:*** Before the flying portion of IQT, pilots must complete requirement items 1, 2, 9, 10, and 11 listed in Table 1.1.

Table 1.1. Aircrew Ground Training Requirements.

ITEM	A	B	C	D	E
	Requirement	**ID**	**Training Code (note 1)**	**Phase Periods**	**Timeframe**
1	Local Area Survival Training. A one-time event conducted prior to the first flight to familiarize pilots with local equipment and rescue procedures. Training should familiarize pilots with equipment, local procedures, requirements, and services provided by the life support section. All aspects of life support training should be covered to the extent necessary to fly locally.	LS01	G	**None**	**Upon PCS**
2	Physiological Training. Refer to AFI 11-403, *Aerospace Physiological Training Program*. Pilots and operational support flyers must attend physiological training prior to the expiration date that is on their AF Form 702,	PP11			**Every 5 years**
3	Cockpit/Crew Resource Management (CRM) Training. Refer to AFI 11-290, *Cockpit/Crew Resource Management Training Program*. The formal courseware will be used to complete the CRM training requirements.	AC05			**Every 17 months**
4	Qualification Evaluation. Complete the qualification examination (open and closed) and qualification as required by AFI 11-202, Volume 2.	AA01		**Six (6) months prior to the due date**	
5	Instrument Evaluation. Complete the Instrument Refresher Course (IRC) in	AA21			

ITEM	A Requirement	B ID	C Training Code (note 1)	D Phase Periods	E Timeframe
	the same phase period as the instrument evaluation. Comply with AFMAN 11-210, *Instrument Refresher Course (IRC) Program*. Complete the instrument open book examination as required by AFI 11-202, Volume 2. Complete the instrument examination in the same phase period as the instrument evaluation.				
6	Mission Evaluation. Complete the mission open book examination and the mission evaluation as required by AFI 11-202, Volume 2.	AB00			
7	Anti-Hijacking. Refer to AFI 13-207, *Preventing and Resisting Aircraft Piracy (Hijacking).* Unit training sections will ensure all pilots and operational support fliers receive anti-hijacking training to cover both standard Air Force and local procedures.	AC04	N	**None**	**Annually**
8	Night Vision Goggles (NVG) Refresher. All applicable pilots require initial and annual training IAW AFI 11-202, Volume 1, *Aircrew Training*. Training will be conducted using formal school, Air Force Research Laboratory, or MAJCOM-approved courseware.	AC13	O		
9	Life Support Equipment. Refer to AFI 11-301, *Aircrew Life Support (ALS) Program,* and MAJCOM	LS06	G		

ITEM	A Requirement	B ID	C Training Code (note 1)	D Phase Periods	E Timeframe
	guidance. Training will be conducted by life support personnel and will include hands-on training of the contents of the life support vest and emergency survival gear carried on the aircraft.				
10	Ground Egress. Refer to AFI 11-301 and MAJCOM guidance. Training will emphasize primary and secondary exits and include a discussion of procedures in the event of unusual landing attitude, fire, injury, and water landing. Initial egress training will be accomplished prior to the first flight. Initial and recurring ground egress training will include training at the aircraft to include instruction on opening all doors and windows and locating and using of fire extinguishers and first aid kits.	LS08			
11	Flight Physical. All pilots will receive an annual flight physical IAW AFI 48-123.	PP01			
12	Flight Records Review. Pilots will review their flight records annually.	RR01	N		

NOTE:
1. Training codes are as follows:
   G - Grounding. The pilot may not perform flight duties until the event is completed.
   N - Nongrounding. The pilot may perform flight duties even though the event is not completed.
   O - Other restrictions. The pilot may perform flight duties even though the event is not completed or is overdue, on the condition that the mission profile does not include the specific event.

1.22.2. Initial Instructor Training MOI, Phase 2. This training will follow the US Army program of instruction and be taught by Army or contract instructors. It covers Army contact maneuvers and qualifies the individual to be an Army contact instructor. It also serves as initial instructor qualification. A comparable AETC-approved syllabus may be developed for instructor training in lieu of this MOI. Once approved, the syllabus would satisfy Phase 2 requirements. ***NOTE:*** To qualify as an Army instrument instructor, 23 FTS instructors will receive "difference training" developed by 23 FTS/DOV and certified by 23 FTS/CC.

1.22.3. Mission Qualification Training (MQT), AFU Mission, Phase 3. MQT will focus on AFU maneuvers and qualify the individual to serve as an IP in the 23 FTS and implement the AFU program. This training will follow an Air Force syllabus of instruction and be taught by Air Force IPs. MQT will be completed with a mission evaluation, including requirements IAW Chapter 2 of this instruction and AFI 11-202, Volume 2.

1.23. Mission Qualifications. These include remote, NVG remote, formation, low level, and NVG low level. There are no certifications. Qualifications require flight evaluations. Training will follow an Air Force syllabus of instruction.

1.23.1. NVG Qualification. Pilots initially qualifying in NVGs will attend the Ft Rucker NVG lab prior to NVG qualification training. NVG instructors must accumulate 50 hours of NVG time before performing in-flight NVG instruction.

1.23.2. Duty Familiarization and Indoctrination Training. The combination of the three phases of qualification will cover all areas normally accomplished in duty familiarization and indoctrination training. As a minimum, the following will be included: local hazards, no-fly areas, airports, navigational aids (NAVAID), arrival and departure procedures, traffic patterns, reporting procedures, helicopter training and landing sites, and other procedures IAW USAAVNC Reg 95-2 and 23 FTS local requirements.

1.23.3. Transfer of Qualifications. Mission qualifications may be transferred between H-1 series aircraft. If a student is already qualified in NVG remote in the UH-1N, that portion of MQT (Phase 3) may be waived by the 23 FTS/DO. Instrument qualification from any rotary-wing aircraft may be transferred. If a pilot's instrument rating has expired, he or she will accomplish an instrument evaluation prior to beginning MQT (Phase 3).

1.24. Continuation Training (CT):

1.24.1. General. Currency requirements may only be satisfied when the individual is current and qualified (not in training status) or he or she is noncurrent and flying with an instructor. Events may be accomplished in either seat. Events accomplished on satisfactory evaluations may be credited toward currency requirements. Waiver authority for ground and flying continuation training is the 58 OG/CC. The 23 FTS/CC may specify additional training requirements.

1.24.2. Ground Training. Table 1.1 lists required aircrew ground training. Due dates are based on last accomplished dates. Any equivalent ground training from previous flying unit may be transferred at the discretion of the 23 FTS/DO.

1.24.3. Flying Currency:

1.24.3.1. Requirements will be tracked semiannually or based on the last date accomplished. (The semiannual cycles are January to June and July to December.) Tracking will begin after successful completion of the Phase 3 qualification evaluation, and events may be prorated IAW Table 1.2.

Table 1.2. Conversion Table for Prorated Training.

ITEM	A Days Unavailable	B Proration
1	16 to 45 days	1 month
2	46 to 75 days	2 months
3	76 to 105 days	3 months
4	106 to 135 days	4 months
5	136 to 180 days	5 months

1.24.3.2. Flying currency requirements are listed in Tables 1.3 and 1.4. Currency may be logged while flying with students, but will be performed "hands on" (with the exception of the simulator).

Table 1.3. Flying Currency Requirements.

ITEM	A Events	B ID	C Every 45 Days	D Every 60 Days	E Quarterly	F Semiannually
1	Basic Sortie	B010	1			
2	Instrument Approach	B070	1			
3	Precision Approach	B080			2	6
4	Nonprecision Approach	B100			2	6
5	Night Sortie	B410			1	
6	EP Sortie	B440			2	
7	Simulator Sorties	B441				**4**
8	NVG Sortie	S610		1		
9	Low-Level Sortie	T050			1	
10	NVG Low-Level Sortie	T060			1	
11	Formation Sortie	T140			1	

Table 1.4. Event Requirements.

ITEM	A Event	B Subevents
1	Basic Sortie	Required: Mission planning, performance data, crew and passenger briefing, crew coordination, flight clearance, taxi and hover, takeoff procedures, approach (instrument or visual), landing procedures, and fuel management.
2	EP Sortie	Required: Boldface procedures, straight-ahead autorotation, low-level autorotation, autorotation with turn, hovering autorotation, hydraulics-off approach and landing, anti-torque procedures, and emergency governor operations.

ITEM	A Event	B Subevents
		Desired: One autorotation to power recovery and one to a touchdown, anti-torques to include one left and one right, simulated engine failure at hover, and altitude. All maneuvers should be accomplished on a single flight.
3	Formation Sortie	Required: Takeoff, approach, en route, and landing procedures as lead and wing; lost visual procedures; and rejoin procedures. Desired: Low level.
4	Low-Level Sortie	Required: Mission planning low-level navigation; low-level approach and landing and, time-on-target (TOT) procedures. Desired: Low-level formation (day).
5	Night Sortie	Required: A basic sortie, 1 hour of night time and 1/2 hour of primary time. ***NOTE:*** Night time for currency begins 1/2 hour after official sunset and ends 1/2 hour before official sunrise.
6	NVG Sortie	Required: A basic sortie, 1 hour of NVG time of which 1/2 hour must be primary. ***NOTE:*** Night time for currency begins 1/2 hour after official sunset and ends 1/2 hour before official sunrise.
7	Simulator Sortie	Required: 1 1/2 hours of simulator time, either with access to a set of controls or while instructing or evaluating during an EP.

1.24.3.3. NVG sorties or events will dual-credit night unaided requirements.

1.24.3.4. Night sorties or events will dual-credit day requirements.

1.24.3.5. Up to 50 percent instrument approaches may be logged in the simulator for the semiannual period.

1.24.4. Loss of Currency or Qualification:

1.24.4.1. Events are delinquent on the first day of the semiannual period. Forty-five- and 60-day requirements are noncurrent on the 46th and 61st days, respectively, following the event.

1.24.4.2. Noncurrent status in event items 1 through 7 listed in Table 1.3 prohibits unsupervised flight in all areas. Loss of currency in any other event prohibits unsupervised flight for the specific event.

1.24.4.3. Pilots may regain instrument currency in the simulator, but they must be certified by an instructor.

1.24.4.4. Pilots noncurrent for over 6 months for a basic sortie are unqualified.

1.24.5. Instructor Requalification. Instructors unqualified under 5 years will use Phases 1 and 3 to requalify. (This only applies to previously qualified instructors in SUPT-H.) Phase 2 need not be repeated. A commander-directed training folder will be established for instructors unqualified for under 2 years.

1.24.6. Multiple Qualification Currency Requirements. Pilots authorized by AETC to maintain currency in both the UH-1H and UH-1N must maintain separate currency tables for each aircraft. Events with the same identifier accomplished in either aircraft may be dual-logged (for both squadrons) with the exception of EP sorties. When dual-logged currency is allowed, a training accomplishment sheet should be turned in to operations management personnel of both squadrons.

1.24.7. Proration of Training Requirements. Requirements may be reduced for pilots who are not available for flying duties for more than 15 days in a training period due to PCS, nonflying TDY, duty not including flying (DNIF), medical or emergency leave, etc. Table 1.2 will be used to calculate the number of sorties and events required. Training requirements will be prorated to less than one event. Proration will be used to adjust for genuine circumstances of training nonavailability, not to mask training or planning deficiencies.

Chapter 2

STANDARDIZATION AND EVALUATION

2.1. General. Rated pilot evaluations will be conducted IAW AFI 11-202, Volume 2, and this instruction**.** This chapter contains detailed procedures and criteria for the evaluation of pilots assigned flying duties in the UH-1H for SUPT-H.

2.2. Evaluation Criteria Source. UH-1H pilot evaluation criteria for instrument, qualification, mission, and instructor evaluations are located in Attachment 2. Some maneuvers refer to the US Army Training Circular (TC) 1-211 *Aircrew Training Manual - Utility Helicopter UH-1,* which is available as UH-1 ATM TC 1-211 at http://www.usarmyaviation.com/pubs.htm. This manual is the sole source of maneuver criteria taught and evaluated in RWQC (contact and instrument phases) and MOI. Evaluations for students enrolled in SUPT-H will be IAW the syllabus (and to syllabus standards).

2.3. Evaluation Conduct:

2.3.1. FEs will use the evaluation criteria contained in this instruction to conduct permanent party evaluations and emergency procedures evaluations (EPE). To ensure standard and objective evaluations, FEs must be thoroughly familiar with the prescribed evaluation criteria.

2.3.2. Unless specified, the examinee and FE may fly in any seat (within their crew qualification) that will best enable the FE to conduct a thorough evaluation. SUPT-H students will sit in the seat determined by the syllabus.

2.3.3. Prior to flight, the FE will brief the examinee on the purpose and conduct of the evaluation and inform the aircraft commander of special requirements. The examinee will accomplish appropriate flight planning and mission preparation. The FE will be furnished copies of mission materials to include necessary maps flight logs, etc. ***NOTE:*** Only one map per aircraft is required.

2.3.4. Evaluators will use AETC Form 15, **UH-1H Flight Evaluation Worksheet,** to aid in administering flight evaluations and EPEs.

2.3.5. When it is impossible to evaluate a required area in flight (due to equipment malfunctions, operational requirements, scheduling restrictions, or weather), the FE may elect to evaluate the area by an alternate method (verbal, procedural trainer). He or she will document why required areas were not evaluated in flight and the alternate method of evaluation used in the examiner's remarks section of the AF Form 8, **Certificate of Aircrew Qualification.** If, in the FE's judgment, a required item cannot be adequately evaluated by an alternate method, the evaluation will be completed on an additional flight.

2.3.6. For initial evaluations, all required items must be performed by actual demonstration and exceptions must be approved by the 23 FTS/DO.

2.3.7. Critical areas will be listed on the AETC Form 15 as "critical." These areas are not eligible for Q-grades (paragraph 2.6.5). A U grade in one of these areas will result in an overall Q-3.

2.3.8. All simulated EP maneuvers will be accomplished IAW the guidance in technical manual (TM) 55-1520-210-10, *Operator's Manual, Army Model UH-1H/V Helicopters;* Chapter 3 of this instruction; and TC 1-211 for Army maneuvers.

2.3.9. The FE will thoroughly debrief all aspects of the evaluation. During the debrief, he or she will review the overall rating, specific deviations, area grades assigned, and required additional training (if applicable).

2.3.10. Instrument evaluations may be administered in the SUH-1H flight simulator.

2.3.11. Any H-1 OGV or higher-headquarters FE may administer aircrew spot evaluations. If the examiner administering a spot evaluation is not a qualified UH-1H pilot, only boldface, safety consciousness, judgment, situational awareness, CRM, and instructor duties may be evaluated.

2.4. Aircrew Publications. Aircrew publications will be checked during qualification evaluations to ensure they are current and properly posted. Each aircrew member is responsible for maintaining the publications listed on the 58 OGV Web site (https://sof.58sow.Kirtland.af.mil/ogv/).

2.5. Cockpit/Crew Resource Management (CRM). CRM is the effective use of all available resources by individuals or crews to safely and efficiently accomplish an assigned mission or task, and the term will be used to refer to the training program, objectives, and key skills directed to this end. CRM will be evaluated on all flight evaluations. Items from the AF Form 4031, **CRM Skills Criteria Training/Evaluation,** IAW AFI 11-290, have been extracted and included on the AETC Form 15. Grading standards will be consistent with the criteria listed on the AF Form 4031 for each specific area and should be referenced. A downgrade (Q-) in a subarea does not automatically require a downgrade in CRM, but a U in a subarea requires a Q- (if not a U) in CRM.

2.6. Evaluation Grading Instructions:

2.6.1. All areas performed will be graded.

2.6.2. Tolerances for in-flight parameters will be based on conditions of smooth air and a stable aircraft. A momentary deviation from tolerances will not be considered if the examinee applies prompt corrective action and such deviations do not jeopardize flying safety.

2.6.3. When grading criteria specifies that airspeed be evaluated, but TM 55-1520-210-10, *Operator's Manual, Army Model UH-1H/V Helicopters,* lists only a minimum, maximum, or recommended airspeed for that area, the examinee will brief the desired airspeed.

2.6.4. The standards and grading criteria contained in Attachment 2 are provided as a guide to help the FE determine grades, but they are not necessarily minimum or maximum parameters for each maneuver. FEs should compare the examinee's performance for each grading area with the standards provided in this instruction and consider all other factors before assigning grades. The overall flight evaluation grade will be derived IAW AFI 11-202, Volume 2, and this instruction.

2.6.5. FE judgment must be exercised when the wording of the grading criteria is subjective and specific situations are not covered.

2.6.6. FE judgment will be the determining factor in assigning the overall grade.

2.6.7. Critical subareas will be graded either Q or U. A U performance in a critical subarea will result in a qualification level of Q-3. Critical subareas are identified in Attachment 2 with an asterisk (*) prior to the subarea number.

2.6.8. Noncritical subareas will be graded Q, Q-, or U. A U performance in a noncritical subarea will result in a qualification level no higher than Q-2.

2.7. Aircrew Examination Procedures:

2.7.1. Computer-based training or electronic information management tools may satisfy the requirement for written examinations if the electronic format meets the requirements for examinations in AFI 11-202, Volume 2.

2.7.2. The minimum number of test questions are:

2.7.2.1. Qualification, open-book—50 questions.

2.7.2.2. Qualification, closed-book—25 questions.

2.7.2.3. Instrument, open-book—50 questions.

2.7.2.4. Mission, open-book—25 questions.

2.8. Master Question File. The 23 FTS will act as lead command proponent in producing a master question file (MQF) for the UH-1H. The 19 AF/DOS will review the MQF annually.

2.9. Evaluation Requisites:

2.9.1. Qualification (QUAL) Evaluation Requisites. A qualification open-book examination, qualification closed-book examination, boldface examination, publications check, and EPE are required for this evaluation.

2.9.2. Instrument (INSTM) Evaluation Requisites. The instrument refresher course and an instrument open-book examination are required for this evaluation.

2.9.3. Mission (MSN) Evaluation Requisites. A mission open-book examination and an EPE are required for this evaluation.

2.10. Emergency Procedure Evaluations (EPE):

2.10.1. An EPE is required on qualification and mission evaluations.

2.10.2. The purpose of the EPE is to evaluate systems knowledge and EPs with a more indepth investigation of systems knowledge and scenario-driven circumstances.

2.10.3. EPEs are normally conducted verbally, but they may be conducted in flight. The flight examiner must use caution to ensure indepth investigation of systems knowledge and scenario-driven circumstances does not interfere with safety of flight or the pilot's performance. FEs may use one continuous scenario throughout the EPE or different scenarios for each EP.

2.10.4. The examinee may use publications normally available in flight. He or she must recall applicable boldface items from memory (Figure 2.1).

Figure 2.1. UH-1H Boldface Procedures.

EMERGENCY GOV OPNS
GOV - switch - EMER
Throttle—adjust as necessary to control RPM
Land as soon as possible

Engine Malfunction - Low-Altitude/Low Airspeed or Cruise
Autorotate
EMER GOV OPNS

Engine Restart - During Flight
Throttle - Off
STARTER GEN switch - START
FUEL switches - ON
GOV switch - EMER
Attempt start
Land as soon as possible

Engine Overspeed
Collective - Increase
Throttle - Reduce
EMER GOV OPNS

Main Driveshaft Failure
Autorotate
EMER SHUTDOWN

Fire - Engine Start
Start switch - Press
Throttle - Off
FUEL switches - OFF

Flight Control Servo Hardover
HYD CONT switch - select opposite position
LAND AS SOON AS POSSIBLE

2.10.5. The following items will be included on EPEs:

2.10.5.1. Boldface procedures. These procedures may be associated with situational EPs (paragraph 2.10.5.2). If not, a knowledge of boldface procedures will be demonstrated to the FE either verbally or written. All boldface emergencies must be covered for qualification evaluations. The UH-1H manual does not employ boldface. Therefore, boldface is established in Figure 2.1.

2.10.5.2. Situational EPs. A representative sample of emergencies per phases of the mission (ground operations, takeoff, en route, and terminal operations) will be discussed.

2.10.5.3. Systems knowledge. This includes operation of systems, limitations, and capabilities.

2.10.5.4. Unusual attitude recoveries and the procedures in AFMAN 11-217, Volume 1, *Instrument Flight Procedures.*

2.10.6. The FE will assign an overall grade (1, 2, or 3) in the Ground Phase block of AF Form 8.

2.11. Qualification (QUAL) Evaluations. The crewmember will complete all required subareas from Areas I, II, and IIA. If the crewmember is an instructor, he or she will include and complete Area IV. Subareas labeled “optional” do not have to be accomplished in flight, but will be evaluated verbally.

2.12. Instrument (INSTM) Evaluations. The crewmember will complete all required subareas from Areas I and III. If the crewmember is an instructor, he or she will include and complete Area IV. Normally, instrument evaluations will be conducted concurrently with qualification evaluations. Subareas labeled “optional” do not have to be accomplished in flight, but will be evaluated verbally**.**

2.13. Mission (MSN) Evaluations. The crewmember will complete all of Area I and, for recurring evaluations, the appropriate mission subareas from Area V for the environment (day or night). If the evaluation is administered during the day, all daytime areas should be evaluated. An attempt should be made to alternate day and night mission evaluations for each cycle. If the crewmember is an instructor, he or she will complete Area IV. Evaluators are encouraged to give a scenario-driven evaluation. Areas not evaluated in flight should be evaluated verbally. Subareas labeled “optional” do not have to be accomplished in flight, but will be evaluated verbally**.**

2.14. Instructor (INSTR) Evaluations:

2.14.1. To initially qualify as an instructor in the UH-1H, pilots will complete the training required in Chapter 1 of this instruction. FEs will administer initial evaluations covering appropriate areas.

2.14.2. There is no recurring INSTR evaluation. Area V will be evaluated on all periodic evaluations for instructors. The examinee’s instructor knowledge and ability will be thoroughly evaluated as outlined in Attachment 2 of this instruction.

2.15. Formal Course Evaluations. Evaluations will be conducted IAW syllabus mission profile guidelines developed from syllabus training objectives. Formal course guidelines may be modified, based on the FE’s judgment. For permanent party, training objectives and related areas will be graded, using the performance criteria in Attachment 2. (Undergraduate student checkrides will be graded according to syllabus standards.) For all initial evaluations, a qualified instructor or FE will be in a seat with a set of controls.

Chapter 3

FLYING OPERATIONS

Section 3A—Operating Requirements

3.1. Minimum Crew. The minimum crew is one pilot, except as follows: (***NOTE:*** Where two pilots are required, an IP and a student pilot are authorized.)

3.1.1. The minimum crew for night or NVG, planned instrument meteorological conditions (IMC), low level, and formation is two pilots.

3.1.2. The minimum crew for student team flights is two student pilots.

3.1.3. The minimum crew for EP training is two pilots, and one must be an IP.

3.2. Mission Kits. A mission kit is required for all flights. The kit will include:

3.2.1. The following flight documents: TM 55-1520-210-10 (flight manual); AF Form 457, **USAF Hazard Report;** AF Form 651, **Hazardous Air Traffic Report (HATR);** AFI 11-202, Volume 3, *General Flight Rules;* and this instruction.

3.2.2. The following flight information publications (FLIP): IFR supplement, VFR supplement, flight information handbook, en route low altitude charts (one set for area of operation), low altitude instrument approach procedures (two for area of operation), and maps and charts, as required.

3.3. Essential Equipment. A list of required equipment is shown in Table 3.1. In addition, whenever an aircraft commander considers an item essential for the accomplishment of the mission, he or she will designate the item mission essential, and it will be repaired or replaced prior to the aircraft's departure.

Table 3.1. Required Equipment.

ITEM	A	B	C	D	E
	Required Equipment (note 1)	**Day**	**Night**	**IMC (note 2)**	**NVG (note 2)**
1	Airspeed Indicator	**X**	X	X	X
2	Anticollison Lights	X	X	X	X
3	Attitude Indicator		X (note 3)	X	X
4	Clock/Watch w/Second Hand	X	X	X	X
5	Commo Equipment	X	X	X	X
6	Flashlight		X		X
7	Free Air Temperature Gauge	X	X	X	X
8	Fuel Quantity Indicator	X	X	X	X
9	Heading Indicator		X	X	X
10	Landing/Search Light (note 4)		X		X
11	Magnetic Compass	X	X	X	X
12	Navigation Equipment			X	
13	Pitot Heater			X	
14	Position/Instrument Lights		X		X
15	Pressure Altimeter	X	X	X	X
16	Transponder			X	
17	Turn and Slip Indicator				X
18	Vertical Gyros and Indicators			X	

ITEM	A Required Equipment (note 1)	B Day	C Night	D IMC (note 2)	E NVG (note 2)
19	Vertical Speed Indicator		X	X	X

NOTES:
1. Equipment designated for flight in day, night, IMC, or NVG must be operational and is the minimum required, regardless of the intended mission.
2. Required equipment items 1, 3, 9, 15, 17, and 19 must be operational at both pilot and copilot stations. All vacuum and electrical sources for flight instruments must be operational.
3. The visible horizon may be substituted for the attitude indicator.
4. The NVG infrared light must be installed and operational for NVG flights below 20 percent illumination. Failure of the light in flight must be evaluated to determine its impact on the mission and further NVG flight.

3.4. Altitude Restrictions:

3.4.1. All operations will be conducted at or above 500 feet above ground level (AGL) except when lower altitudes are required for takeoff, landing, and training flights in approved areas or routes.

3.4.2. The minimum altitude for low-level training is 100 feet above highest obstacle (AHO).

3.4.3. Buildings, farm-related facilities, and structures will be avoided by 500-foot slant range.

3.5. Weather Minimums. An appropriate course of action must be available (and briefed) in the event of an emergency after takeoff. Forecast and observed weather (predominate) must meet the minimums specified. Instrument flight rule (IFR) and visual flight rules (VFR) cross-country flights require a DD Form 175-1, **Flight Weather Briefing,** or equivalent. Crews should obtain the most current weather available prior to departure.

3.5.1. All VFR training flights require a 700-foot ceiling and 2 statute miles (sm) visibility, except as follows:

3.5.1.1. Night, NVG, cross-country, and student team flights require a 1,000-foot ceiling and 3 sm visibility.

3.5.1.2. If observed or forecast weather conditions deteriorate below the specified minimums, training will terminate by recovering to a base field or landing the aircraft.

3.5.2. IFR approach and takeoff minimums are IAW Chapter 8 of AFI 11-202, Volume 3.

3.5.3. Surface wind limits are 30 knots or a gust spread of 15 knots. For student team sorties, the wind limits are 20 knots (including gusts) or a gust spread of 10 knots.

3.5.4. Do not operate aircraft in weather conditions exceeding the limitations specified in TM 55-1520-210-10 (flight manual). If adverse weather is encountered, either land or divert. Flight may be made into areas of known or forecast thunderstorms if visual meteorological conditions (VMC) are maintained and thunderstorm activity is avoided by a minimum of 5 nautical miles (nm). Flights will not be made into rain shafts beneath cumulonimbus clouds.

3.6. Standard Configurations and Weight and Balance. Current weight and balance data for each aircraft is maintained by US Army contract maintenance on “canned” DD Forms 365-4, **Weight And Balance Clearance Form F-Transport.** These forms are located at base operations and in the forms book of each aircraft. They are authorized for all normal operations. If the precomputed “canned” forms do not match the mission configuration, the pilot will complete a new one. ***NOTE:*** A new or corrected form will be computed if the initial takeoff weight changes by more than 500 pounds. For configuration changes less than 500 pounds, the aircraft commander will ensure the resulting center of gravity is within limits.

3.7. Passengers:

3.7.1. The 23 FTS is occasionally tasked to fly with passengers on board. In this case, AFI 11-401/AETC Sup 1 will be followed.

3.7.2. Passengers will be escorted through the safe approach zone when the aircraft is being on- or off-loaded with rotors turning. They will be briefed by the aircraft commander or designated representative on procedures to be followed.

3.7.3. Passengers will <u>not</u> occupy a cockpit seat with the engine running.

3.7.4. All passengers will receive egress, aircraft familiarization, and emergency procedures briefings.

3.7.5. Prior to flight, aircrews will ensure hearing protection is available for all passengers.

Section 3B—Aircrew Procedures

3.8. Aircrew Uniforms and Protective Devices:

3.8.1. When reporting for flying duties, pilots will wear appropriate flying clothing and carry a set of identification (ID) tags on their person.

3.8.2. Aircrews will wear a reflective belt from official sunset to official sunrise while on the flight line. Reflective materials will not be permanently attached or affixed to flight clothing.

3.9. Aircrew Publications Requirements. The aircraft commander will maintain and carry TM 55-1520-210-10 (flight manual) during flight. Aircrews will insert the current 23 FTS Flight Crew Checklist Training Aid and 23 FTS In-Flight Guide in checklist binders. Additional notes amplifying checklist procedures and limitations may be added in pencil. Currency of notes is the crewmember's responsibility.

3.10. Maps. Pilots will plan flights and fly with current maps. A current map will consist of the most recent edition IAW the 23 FTS Hazards Map. The 23 FTS/SE will maintain a 1:250,000 joint operation's graphic (JOG) Hazards Map with updates from the Chart Updating Manual (CHUM) posted.

3.11. Crew Briefings and Checklists. The pilot will ensure all applicable briefings and checklists are completed prior to the event. A checklist is not complete until all items have been completed in sequence.

3.12. Flight Crew Information File (FCIF). The FCIF contains reference material appropriate for 23 FTS operations as designated by the 58 OG/CC. Aircrews will review FCIF Volume I, Current Read File, before departure on all missions. AETC Form 1138, **Flight Crew Information File Record of Review,** will be updated by all crewmembers if new material has been added to the FCIF since the last review. Initialing the AETC Form 1138 certifies review of all items. Crewmembers delinquent in FCIF review or joining a mission en route will receive an FCIF update from the aircraft commander.

3.13. Flight Plans. A locally approved form or flight manifest is authorized for use in lieu of DD Form 175, **Military Flight Plan,** for VFR flights terminating at the base of departure.

3.14. Flight Planning:

3.14.1. An AF Form 70, **Pilots Flight Plan and Flight Log,** or other more detailed form, will be used for all flights outside the local flying area.

3.14.2. An AF Form 70 will be prepared for each navigation, remote, low-level, and NVG mission. As a minimum, the form will include turning points, headings, distances, estimated times of arrival (ETA), minimum safe altitudes (MSA), and fuel computations. A copy of the AF Form 70 will remain with the squadron duty officer (SDO).

3.14.3. Takeoff and landing data (TOLD) will be completed prior to takeoff; whenever possible, prior to the aircrew briefing. Data applicable to the mission profile will be computed and recorded on DA Form 7243-R, **UH-1 Performance Planning Card (PPC).**

3.14.4. The same TOLD will suffice for consecutive takeoffs and landings when aircraft gross weight or environmental conditions have not increased significantly; that is, 200 pounds gross weight, 5 degrees Celsius, or 500 feet pressure altitude (PA).

3.14.5.Aircraft commanders must plan to arrive at the destination with a fuel reserve of 20 minutes (for VFR) and 30 minutes (for IFR).

3.14.6. Students will prepare a mission card with, at a minimum, LZ and flight sequence data for all remote, low-level, formation, and NVG sorties. A copy should be provided to the IP at the aircrew brief. The card may be tailored to meet mission sequence or flight requirements.

3.15. Required Documentation:

3.15.1. DA Form 2408-13, **Aircraft Status Information Record,** will be reviewed before applying power to the aircraft or operating aircraft systems. The fuel identaplate or AVCARD (an aviation credit card) must be aboard the aircraft when off-station refueling is planned or required. A “canned” DD Form 365-4 will be dated within 1 year.

3.15.2. Prior to departure, the pilot will ensure a current mission kit is aboard the aircraft**.**

3.16. Aircraft Servicing and Ground Operations:

3.16.1. At locations with refueling support, aircrews will not personally accomplish the refueling unless extenuating circumstances dictate. When not directly involved in the refueling operation, personnel will remain at least 50 feet from the aircraft. Hot refueling requires execution of the 23 FTS Hot Refueling checklist in the 23 FTS In-Flight Guide.

3.16.2. At Ft Rucker, aircrews will follow local procedures for taxi and obstruction clearance.

3.17. Dropped Object Prevention:

3.17.1. During preflight inspections, the aircrew will pay particular attention to panels and components, which are potential dropped objects. All cargo and mission equipment inside the aircraft must be secured prior to any aircraft movement. ***WARNING:*** Loose objects can become hazardous projectiles during any violent maneuver or hard landing, and they must be secured to prevent injury to personnel and/or damage to the aircraft.

3.17.2. When passengers are in the cargo compartment, the cargo doors will remain closed during flight unless an aircrew member is also in the cabin.

3.18. Life Support Requirements. The pilot will ensure sufficient quantities of appropriate serviceable life support and survival equipment and protective clothing for the entire mission are aboard the aircraft. Crewmembers will wear survival vests on all flights.

3.19. Instrument Cockpit Check. If IMC is expected to be encountered during flight, an instrument cockpit check will be completed prior to takeoff. An instrument cockpit check will also be completed prior to conducting practice instrument procedures.

3.20. Checklist. Checklist use will be IAW with the challenge and response method. The aircraft commander determines who will read (challenge) and who will accomplish and respond. (***NOTE:*** The appropriate response is listed in the checklist. If the listed response is "as required," the response should be the current setting.) A checklist is not complete until all items have been completed in sequence.

3.21. Seatbelts:

3.21.1. At least one pilot will have his or her seatbelt and shoulder harness fastened when rotors are turning.

3.21.2. When doors are open during flight, all occupants in the cabin area will wear a seatbelt or gunner's belt.

3.21.3. When doors are closed during flight, the aircraft commander may direct crewmembers to perform duties in the cabin unrestrained for brief periods as required.

3.22. Radios:

3.22.1. The pilot will tell the crew which radio is the primary radio. All crewmembers will monitor the primary radio unless specifically directed otherwise by the aircraft commander.

3.22.2. All crewmembers will listen to the intercom. Clearance is required from the aircraft commander prior to going off the intercom. During critical phases of flight, intraplane transmissions will be limited to those essential for crew coordination.

3.23. Scanners. Crewmembers who are not performing basic crew duties will be used as scanners to avoid obstacles during ground taxiing and confined area operations and to reduce the potential of a midair collision during arrivals, departures, and simulated instrument flight.

3.24. Forced or Precautionary Landings. The helicopter has a unique ability to land nearly anywhere, which provides the pilot with a tremendous safety advantage. If the pilot becomes doubtful of the helicopter's airworthiness or encounters hazardous weather conditions, he or she will execute a precautionary landing, provided the landing conditions are not more hazardous than the in-flight problem. Aircraft security and accessibility for maintenance are secondary considerations to aircrew safety. All precautionary landings will be reported through appropriate channels as soon as communications are established.

3.24.1. Forced or Precautionary Landings Due to In-Flight Malfunction. The aircrew will comply with local procedures. In the event a forced or precautionary landing occurs at a location where communications are not available, the aircrew will remain at the landing site and await assistance. If a greater hazard exists to the crew or aircraft at the landing site, the aircrew will continue to the nearest safe landing area. The decision to resume flight under these circumstances must be based on a thorough evaluation of all the hazards and risks involved.

3.24.2. Precautionary Landings Due to Weather. If deteriorating weather is encountered during VFR operations, the aircrew will consider a precautionary landing a viable option in addition to course reversal, course deviation, or continuation under IFR. The aircraft commander may authorize further flight after a precautionary landing for weather. He or she will make a reasonable effort to notify appropriate agencies of the precautionary landing and to determine additional weather information.

3.25. Flight Following. Flight following with an appropriate controlling agency (hub, flight service station [FSS], air traffic control [ATC]), or aircraft is required for all flights. Aircrew conducting formation flights must establish flight following with an agency or aircraft outside of their formation.

3.26. Instrument Calls:

3.26.1. Mandatory altitude calls for the pilot not flying (PNF) during IFR include:

3.26.1.1. For nonprecision approaches, "one hundred feet above minimums," "minimums" at MDA, and "runway in sight." Do not call too soon when obstructions to vision (fog, haze, low stratus clouds, etc.) are present. Call "go around" at the missed approach point if the runway environment is not in sight.

3.26.1.2. For precision approaches, "one hundred feet above." Then call "land" at decision height (if the runway environment is in sight and the aircraft is in a position for a normal landing) <u>or</u> "go-around," if not.

3.26.1.3. Calls during climbout or descent are at 500 and 100 feet below (or above) assigned altitude <u>and</u> 500 and 100 feet above (or below) initial approach fix altitude or holding altitude.

3.26.2. In addition, the PNF will announce heading deviations of 10 degrees, airspeed deviations of 10 knots, or altitude deviations exceeding 100 feet. Any crewmember seeing a deviation of 100 feet in altitude or a potential terrain or obstruction problem will immediately tell the pilot. Deviations from prescribed procedures for the approach being flown will also be announced.

3.27. Maintenance Debriefing. As soon as possible after arrival, the aircraft commander and other required crewmembers will attempt to debrief maintenance personnel on the condition of the aircraft. If a maintenance technician is not available or there is not sufficient time to debrief with the technician, the aircraft commander will ensure the forms are correctly and completely filled out and place them on the pilot's seat before departing the aircraft.

3.28. Postflight Debriefing:

3.28.1. The aircraft commander of each flight will give each crewmember the opportunity to discuss unusual aspects of the mission. These debriefings may be formal or informal, as the situation requires.

3.28.2. For training flights, the instructor will review and evaluate the overall training performed, advise the student of future training requirements, answer technical questions, and complete training reports.

Section 3C—Training Procedures

3.29. Instructor Requirements. The student-instructor ratio will not exceed 2:1. The waiver authority is the 23 FTS/DO, class commander, or lead IP. Instructors are safety observers and are responsible for the actions of their students. The lead IP for a flight will conduct the daily briefing and ensure all instructors in the flight are thoroughly briefed on mission execution and potential hazards.

3.29.1. Training is designed to develop aircrew proficiency, reaction time, planning, and judgment in preparation for actual emergencies. Simulated emergencies must provide realistic training without unacceptably increasing risk. Simulated emergency maneuvers will be accomplished IAW TM 55-1520-210-10 (flight manual) and this chapter.

WARNING

Instructors must be alert and take prompt action to terminate simulated emergency maneuvers and to execute corrective action at the first indication of deteriorating aircraft performance or serious student proficiency problems.

3.29.2. The instructor will place emphasis on the procedures for positive identification of the simulated emergency condition before initiating corrective action. System failures must not be unreasonably compounded. The "surprise" approach of initiating emergency procedures must be tempered to allow for a possible wrong reaction, which could jeopardize safety. Therefore, such emergencies will only be practiced with sufficient airspeed and altitude to ensure a safe recovery.

3.29.3. In high-density traffic areas, emergencies that could require an indepth analysis, a discussion, or detailed cockpit duties will only be simulated when traffic congestion is at a minimum.

3.30. Prohibited Maneuvers. The following maneuvers will not intentionally be accomplished in the aircraft: actual engine shutdown in flight, blade stall, and power settling (vortex ring state).

3.31. Training Requirements:

3.31.1. Unusual attitude and emergency procedures training will be accomplished only during day VMC conditions with no passengers on board. An IP or FE pilot must always be at a set of controls.

3.31.2. Local stage fields and airfields will be used for emergency and normal procedure maneuvers that require a slide landing. If accurate wind information cannot be obtained through tower services, a wind detection device, readily discernible to the pilot flying, is required.

3.31.3. The in-flight guide (IFG) will have a depiction of the stage field, highlighting all normal and unusual conditions; for example, size, landing directions, and location of any known obstructions (wind socks, tires, etc.).

3.32. Maneuver Parameters:

3.32.1. Maneuver parameters (traffic patterns, takeoff and landings, hovering maneuvers, transition maneuvers, and EP training) are provided in this instruction to supplement TM 55-1520-210-10 (flight manual).

3.32.2. These maneuver procedures are intended for all missions, but may not reflect the optimum performance required for some operational situations. Maneuvers will be flown with emphasis on precise altitude, airspeed, and aircraft control.

3.33. Traffic Pattern. The pilot will:

3.33.1. Enter the traffic pattern on a 45-degree angle to the center of the downwind leg (or as directed by the controlling agency) and accomplish the before-landing check. Fly the downwind leg at a 500-foot AGL and 90 knots indicated airspeed (KIAS) right-hand traffic pattern unless otherwise published.

3.33.2. During the turn to base, descend to 300 feet AGL and slow the aircraft to 70 KIAS. Pattern altitudes may be adjusted to comply with local ATC rules. (While flying traffic patterns at stage fields, use the altitudes listed in the IFG.)

3.33.3. Use caution to avoid excessive bank angles and descent rates or low airspeeds. The point of rollout on final should allow a controlled, straight approach without the need for aggravated flares, abrupt control movements, or large collective inputs.

3.33.4. Use proper power management to climb, level off, and descend as appropriate. The entry altitude for all approaches will be 300 feet AGL unless otherwise specified in this instruction.

3.34. Takeoffs and Landings. The pilot will:

3.34.1. Use a constant heading or ground track into the wind or aligned with the runway. Accomplish crosswind correction by using the wing-low method on takeoff until a climb is established and during the final portion of the approach. At other times, use the crab method.

3.34.2. Ensure all turns are cleared prior to beginning a turn.

3.34.3. For all takeoffs, visually clear to the sides and overhead before increasing collective. Following a takeoff, turn to crosswind after reaching a safe altitude and airspeed. Then continue to climb to leveloff at the pattern altitude. ***NOTE*:** A safe airspeed and altitude for maneuvering is defined as being outside of the avoid zone of the height-velocity diagram (depicted in Figure 9-3 of TM 55-1520-210-10 [flight manual]).

3.34.4. On leveloff, lower the nose to accelerate to pattern airspeed prior to reducing power. When departing the pattern, turn 45 degrees away from traffic on the crosswind leg (or as cleared).

3.34.5. As a rule of thumb, lead a leveloff by 10 percent of the climb or descent. For example, prior to leveloff at downwind altitude if climbing at 500 feet per minute (fpm), the pilot will start adjusting the controls for level flight at 50 feet prior to the intended altitude.

3.35. Hovering Maneuvers. A 3- to 5-foot skid height will be used for hovering maneuvers unless circumstances require higher. Hovering turns will be performed, using a constant rate of turn, not to exceed 90 degrees in 4 seconds.

3.36. Transition Maneuvers:

3.36.1. Normal Takeoff. Select a reference point to maintain a constant ground track. Use hover power plus 3 pounds per square inch (psi). From the ground or a hover, smoothly increase power to the desired setting while accelerating forward. After passing effective translational lift (ETL), adjust the attitude to climb (target 70 KIAS prior to 100 feet). At 70 KIAS, terminate the maneuver and adjust the power and attitude for a normal climb. ***NOTE:*** A normal takeoff is one in which the aircraft exposure time to the AVOID area of the height-velocity diagram is minimized.

3.36.2. Marginal Power Takeoff. Simulate maximum power available as 5-foot hover power and simulate a 50-foot obstacle. Initiate the takeoff from a 3- to 5-foot hover by smoothly applying forward cyclic. As the aircraft accelerates, it may tend to settle, especially with light or calm winds. If necessary, compromise the maneuver by adding power to avoid ground contact. Parallel the ground until ETL is attained. After passing through ETL, initiate a climb (without decelerating below ETL) to clear the simulated obstacle. After the desired altitude has been reached, smoothly accelerate (without descending) to 50 KIAS. At 50 KIAS, terminate the maneuver and adjust the power and attitude for a normal climb.

3.36.3. Maximum Performance Takeoff. Simulate maximum power available as hover power plus 6 psi and simulate a 100-foot obstacle. From the ground or a hover, smoothly increase power to the required setting. After climbing through normal hover altitude, adjust the cyclic to establish the desired climb attitude. The forward speed and rate of climb (angle) may be varied to achieve the desired performance. When sufficient altitude to clear the simulated obstacle has been reached, smoothly accelerate to 70 KIAS without descending. At 70 KIAS, terminate the maneuver and adjust the power and attitude for a normal climb.

3.36.4. Normal Approach: (***NOTE:*** During any approach, avoid tail-low attitudes near the ground. At a 12-degree nose-up attitude, the tail stinger and rear skids contact the ground simultaneously.)

3.36.4.1. Enter the normal approach from 300 feet AGL and 70 KIAS. When approaching the desired angle (apparent 30 degrees), lower the collective to establish the descent and then start a gradual reduction of airspeed. The power required, aircraft attitude, and approach speed will vary with different aircraft weights, density altitude, and winds. Primarily, the rate of closure is controlled by the cyclic. Adjust the rate of closure so ETL will be lost as the aircraft starts to enter ground effect (about 50 feet). An occasional crosscheck of the airspeed should indicate a gradual decrease.

3.36.4.2. Coordinated movements of the cyclic and collective will be required to maintain the desired angle and to decrease forward speed resulting in a steady closure rate. Allow a smooth transition to at or near zero groundspeed at a 3- to 5-foot hover over the landing spot. As power is applied to slow the rate of descent and to establish the hover, apply left pedal to compensate for the increase of torque. Entering ground effect and adding power causes the nose to rise slightly, requiring forward pressure of the cyclic.

3.36.4.3. Below 50 feet, make crosswind corrections, using the wing-low method. Aim for the transmission of the aircraft to terminate over the desired panel.

3.36.5. Steep Approach:

3.36.5.1. Turn to final at 70 KIAS and base altitude. On final approach descend to 300 feet and decelerate aircraft to apparent 30 knots groundspeed. When the desired angle is intercepted (apparent 45 degrees), lower the collective to begin the descent. The apparent angle at which the approach is started will be maintained throughout the approach. After the approach is entered, use the collective to control the angle and the rate of descent. Use the cyclic to control the rate of closure. Combine the controls to effect a smooth transition to near zero groundspeed over the intended landing spot.

3.36.5.2. To correct for crosswinds above 50 feet, use the crab method. Below 50 feet, make crosswind corrections, using the wing-low method. Aim for the transmission of the aircraft to terminate over the desired panel.

WARNING

On final approach, monitor the following three parameters: (1) proper rate of closure, (2) rate of descent under control, and (3) power smoothly increasing, but below hover power. Reducing forward speed below 30 knots with rates of descent in excess of 800 fpm may result in "settling with power."

3.36.6. Shallow Approach. Execute this approach the same as a normal approach, but use a 10-degree apparent angle.

3.36.7. Turning Approaches. A turning approach can be initiated from any position in relation to the intended landing area. For training, normally initiate a 90-degree turning approach from base altitude and airspeed and a 180-degree or more turning approach from downwind altitude and airspeed. Throughout the turn, adjust airspeed and rate of descent to maintain the desired approach angle. Avoid steep approach angles, high bank angles, and high descent rates during the maneuver. Progressively decrease groundspeed and rate of descent so as to enter a hover, touchdown, or slide over the intended landing spot.

3.36.8. Approach to a Touchdown:

3.36.8.1. Initiate and fly the desired approach angle. As hover altitude is approached, continue the descent and angle while slowing groundspeed and vertical velocity to achieve a landing attitude at or near zero groundspeed upon touchdown. Cushion the touchdown and continue to fly the aircraft fully onto the ground.

3.36.8.2. Monitor power applied as approaching a hover. Exceeding required hover power should not be necessary as long as the descent is under control. In fact, lowering the collective may be required upon reaching "ground cushion" to prevent stopping in a hover. Practice the approach to a touchdown for whiteout or brownout prevention and marginal power landings.

3.37. Emergency Procedures Training:

3.37.1. Army Maneuvers. For conditions standards and method, Army maneuvers will be conducted strictly IAW the TC 1-211. These maneuvers include standard autorotation to touchdown, autorotation with turn (180 degrees) to touchdown, low-level autorotation, hovering autorotation, hydraulic-off approach, simulated engine failure (SEF) at a hover, SEF at altitude, manual throttle operation, and anti-torque approaches.

3.37.2. Unusual Attitude Training. Entry must be at or above 1,000 feet AGL. Simulated unusual attitudes will not exceed 30 degrees of bank, a 20-degree nose-high attitude, or a 10-degree nose-low attitude.

3.37.3. Simulated Engine Failure (SEF). SEF training will be conducted in an area suitable for an actual landing. Instructors will ensure positive radio communication with ATC or another helicopter. Entry will be at or above 700 feet AGL. The maneuver will be terminated with a power recovery, and a normal climb must be established prior to reaching 200 feet AGL. ***CAUTION:*** SEFs will not be given in areas of high-traffic density; for example, corridors or air check points.

3.37.4. Practice Autorotations:

3.37.4.1. Due to the risk associated with this maneuver, carefully consider wind, density altitude, aircraft gross weight, and individual pilot proficiency prior to performance of the maneuver. Fly each autorotation as if a landing may be required so that if a malfunction occurs, the aircraft is in position to execute a safe landing.

3.37.4.2. Accomplish autorotations to a runway or taxiway.

3.37.4.3. Minimum entry altitude is 800 feet AGL for 180-degree autorotations and 500 feet AGL for all others (except hovering autorotations).

3.37.4.4. Practice autorotations require the aircraft landing direction heading to be aligned within 45 degrees of the wind direction when winds exceed 10 knots (including peak gusts). At or below 10 knots (including peak gusts), the aircraft landing direction heading will be within 90 degrees of the wind. For hovering autorotations, the wind must be aligned within 15 degrees of landing heading. A wind indicator must be close enough to the recovery point to provide readily discernible and accurate wind information.

3.37.4.5. When practicing turning autorotations in excess of 180 degrees, terminate by power recovering at or above 250 feet AGL.

3.37.4.6. The initial autorotation for training or currency will be a straight-ahead autorotation accomplished by the IP to evaluate aircraft performance. During an evaluation, the pilot being evaluated may perform the first autorotation.

3.37.4.7. IPs will terminate the maneuver and initiate a power recovery at the first indication of abnormally high or low rotor revolutions per minute (rpm), excessive sink rate, low airspeed, or ineffective flare or any time an inadvertent touchdown might occur.

3.37.5. Steady State. For practice autorotations, aircraft must be wings level, rotor rpm within limits, normal rate of descent (less than 3000 fpm), and aligned with the runway or lane heading at no lower than 150 feet AGL. (This restriction does not prohibit minor heading corrections on final.) Additionally, the aircraft must be at a minimum of 70 knots prior to the flare.

3.37.6. Straight-Ahead Autorotation:

3.37.6.1. To enter, smoothly lower the collective to minimum, reduce the throttle to engine idle, and apply the right pedal to maintain coordinated flight. During the descent, check engine instruments for normal indications and adjust collective to maintain rotor within limits. Adjust the aircraft attitude to attain the desired glide airspeed.

3.37.6.2. At approximately 75 to 100 feet, initiate a flare appropriate for environmental conditions by smoothly applying aft cyclic. This flare will reduce the rate of descent and groundspeed while allowing the rotor rpm to build. While in the flare, begin to slowly rotate the throttle to full open.

3.37.6.3. At no lower than 25 feet, smoothly rotate the aircraft to a landing attitude (approximately a hover attitude—slightly nose high). Make an initial power pull at 15 to 25 feet. Cushion as necessary to terminate with power no lower than 4 feet above the ground, between 0 to15 knots groundspeed, and with no lateral drift.

WARNING

Make sure the collective is at the minimum setting to maintain rotor within limits prior to advancing the throttle above engine idle. Also ensure throttle application is smooth. Failure to adhere to these requirements could result in sprag clutch wear and eventual failure.

WARNING

Avoid low airspeed or high vertical descent during the final portion of any practice autorotation because engine power or rotor inertia may not be sufficient to recover under these conditions.

3.37.6.4. Avoid chasing the airspeed with rapid, erratic changes of aircraft attitude. These changes make airspeed and rotor parameters difficult to maintain.

3.37.6.5. Aircraft trim is critical to successful completion of the maneuver.

3.37.6.6. If at any time the safe completion of the practice autorotation is in doubt, initiate an immediate power recovery or a go-round as the situation dictates.

3.37.7. A 180-Degree Autorotation:

3.37.7.1. To enter, smoothly lower the collective to minimum, reduce the throttle to engine idle, and apply the right pedal to maintain coordinated flight. During the descent, check engine instruments for normal indications and adjust the collective to maintain rotor within limits. Adjust bank angle and turn rate within limits so as to roll out on final and meet all the steady state requirements listed above. Adjust attitude in the turn to maintain 80 knots ±20 knots throughout the turn.

3.37.7.2. At approximately 75 to 100 feet, initiate a flare appropriate for environmental conditions by smoothly applying aft cyclic. This flare will reduce the rate of descent and groundspeed while allowing the rotor rpm to build. While in the flare, begin to slowly rotate the throttle to full open.

3.37.7.3. At no lower than 25 feet, smoothly rotate the aircraft to a landing attitude (approximately a hover attitude—slightly nose high). Make an initial power pull at 15 to 25 feet. Cushion as necessary to terminate with power no lower than 4 feet above the ground, between 0 to 15 knots groundspeed, and with no lateral drift.

WARNING

Do not dive excessively to regain airspeed because dangerously high rates of descent can develop. A slight amount of aft cyclic in the turn may help control any diving tendencies while allowing a sufficiently nose low attitude to be maintained for maintenance of desired airspeed.

WARNING

Make sure the collective is at the minimum setting to maintain rotor within limits prior to advancing the throttle above engine idle. Also ensure throttle application is smooth. Failure to adhere to these requirements could result in sprag clutch wear and eventual failure.

WARNING

Avoid low airspeed or high vertical descent during the final portion of any practice autorotation because engine power or rotor inertia may not be sufficient to recover under these conditions.

CAUTION

Rotor rpm will tend to build in the turn and any time aft cyclic is applied. Careful management of collective will prevent an overspeed.

3.37.7.4. Aircraft trim is critical to successful completion of the maneuver

Section 3D—Unprepared Landing Site Procedures

3.38. General. This section provides guidance for the successful accomplishment of unimproved landing site operations. Each area of possible operations requires detailed knowledge of the problems that may be encountered. Prior to performing an approach to landing or a hover, the pilot must consider crew qualification, aircraft power and capability, weather (including winds), terrain, environmental factors, illumination, and mission requirements. The final decision to accomplish the approach or landing rests with the aircraft commander.

3.39. Aircraft Control Techniques. The smoother the pilot flies, the greater the helicopter's efficiency. Maintaining a steady rotor disc provides the greatest performance with the least power. All remote approaches must be flown with the utmost precision, especially during the final approach phase. A pilot must not get in a hurry with fast or erratic approaches. Remote area approaches should not be so fast as to require a flare in order to terminate, nor should they be so slow as to cause loss of ETL before the helicopter is in an immediate position to land.

3.40. Preparation. During premission preparation, use all available resources to ensure aircraft and crew limitations are not exceeded. Consider available winds, terrain, and power available or required to prevent an inadvertent entry into an unrecoverable flight regime. Although altitude and temperature are major factors in determining helicopter power performance, this information may not be available for the site of intended operation and will require an onscene evaluation. Accurate wind information is more difficult to obtain and more variable than other planning data. Do not depend on preferable wind information in advanced planning data. Obtain and use all information available for adequate premission planning.

3.41. Crew Coordination:

3.41.1. General. Crew coordination is essential to safe operations. Each crewmember has specific responsibilities. Although safe operation of the aircraft is ultimately the responsibility of the aircraft commander, it is also the responsibility of each crewmember. Any time confusion exists about current or future operations, ask questions and get clarification. If the aircraft or crewmembers are not performing correctly, call "go-around" (paragraph 3.46). The pilot flying (PF) must initiate a go-around immediately, and the situation must be discussed and clarified prior to reattempting the approach.

3.41.2. Pilot Flying (PF). The PF will verbalize the site evaluation and plan of action, request input from crewmembers, and brief abort route and go/no-go decision points and procedures (paragraph 3.42.4). He or she will fly the aircraft using the parameters of the transition maneuvers; that is, if a normal approach is briefed, all normal approach transition parameters apply. The PF will select and announce the specific spot to which he or she intends to fly the approach. Doing this will focus attention on flying a precise approach and provide scanners the information needed to offer constructive inputs. The PF will advise the crew when he or she loses sight of the landing area and request directional input. Once in the landing area, the PF will not maneuver the aircraft until adequate obstacle clearance is assured.

3.41.3. Pilot Not Flying (PNF). The PNF will take an active part in providing accurate and timely input to the PF. The PNF will confirm TOLD (recompute, if necessary), confirm power requirements, and be aware of power available versus power required (the power margin). He or she will inform the PF of the amount of power being applied. The PNF will monitor the approach angle, approach path, airspeed, vertical velocity, attitude, and altitude and make advisory calls for deviations. In the landing area, he or she will monitor engine instruments and help maintain adequate blade tip clearance.

3.41.4. Scanner. In addition to clearing the aircraft of all obstacles, the scanner will monitor approach angle, obstacle clearance, altitude, and closure rates to the specific landing area. Once it is below the level of the obstacles, the scanner will help the PF maintain adequate obstacle clearance.

3.41.5. Voice Procedures. On final approach, the PNF will make advisory altitude calls in 100- foot increments when above 300 feet AGL and 50-foot increments when below 300 feet AGL. After each advisory call, the scanner will provide terrain or hazard clearance inputs.

3.42. Unprepared Landing Sites:

3.42.1. The PF will complete a site evaluation when landing to an unprepared or unfamiliar landing area, except from low-level flight. The aircraft commander may elect not to complete a full site evaluation if doing so would severely degrade the mission. When conditions are equal to or better than previous approaches to the same area, only one site evaluation is required during successive approaches.

3.42.2. The unprepared site evaluation will consist of high and low reconnaissance. Terrain, wind, obstacles, and emergency landing areas dictate the pattern flown during the landing site evaluation. The pattern will be planned to remain oriented in relation to the wind and intended landing area.

3.42.3. Although there is not a standard pattern that covers all situations, a rectangular or modified rectangular traffic pattern should be flown. A pinnacle landing area may require flying around it at a constant altitude to provide a view of the site from all possible angles. This reconnaissance may also identify areas of updrafts and downdrafts indicating wind speed and direction. As many flybys as necessary will be executed. Prior to commencing the low reconnaissance, a power available check will be completed (paragraph 3.43).

3.42.4. The high reconnaissance will be flown at approximately 300 feet above the site, offset to the side, with a minimum airspeed of 50 KIAS. The following will be evaluated: winds (direction, turbulence, and null areas), elevation at the site, temperature and pressure altitude at the site, power (available, required, and margin), approach and departure routes, suitability (size, slope, and surface), escape routes, and go/no-go point. ***NOTE:*** The go/no-go point is the point at which maximum power available is insufficient to go around; that is, beyond this point, the aircraft is committed to landing.

3.42.5. The low reconnaissance will allow refinement of items noted in the high reconnaissance. The PF should fly the low reconnaissance as nearly as possible on the same approach angle and route selected for the final approach. The low reconnaissance will serve as an aid in determining the safest final approach path. If the selected approach route is not satisfactory, another route will be selected and another low reconnaissance executed. Pilots may descend to a minimum of 50 feet above the highest obstacle along the flightpath. An approach that is offset to the side of the site will enable the pilot to perform a thorough visual inspection at a minimum of 50 knots and to reconfirm items reviewed on the high reconnaissance. During the low reconnaissance, the pilot will determine a touchdown point. At his or her discretion, the low reconnaissance may be performed on final approach if out of ground effect (OGE) hover power is available.

3.42.6. Wind is the most variable of all factors and must be constantly evaluated as follows:

3.42.6.1. Prior to descent for a high reconnaissance, the pilot should have a general idea of wind direction and velocity.

3.42.6.2. Several methods are available to determine wind direction and velocity. Smoke provides the most reliable method, but it constitutes a fire hazard when used in areas covered with combustible vegetation. Helicopter drift is another method, but the accuracy of this method depends on the wind velocity. This procedure is accomplished by setting up a constant airspeed and angle of bank and exposing the aircraft to the wind while making the turn. As the site is approached, the pilot will roll into a turn so as to pass directly over the site at a constant airspeed and angle of bank. After completion of a 360-degree turn, the pilot will note his or her position. (The wind will be blowing from the site to his or her position.)

3.42.6.3. Another method of determining wind direction is to deploy a streamer over a known position and visually follow it to the ground. Wind direction can also be determined from foliage, ripples on water, blowing sand, snow, or dust.

3.43. Power Available Check:

3.43.1. Perform a power available check prior to unprepared landing site operations. Perform this check en route to or at the site and prior to the low reconnaissance.

3.43.2. Perform the power available check as near as possible to the same PA and outside air temperature (OAT) as the site. Slowly apply collective pitch without drooping rotor speed (Nr) below 319 rpm until reaching OGE +3 psi or until a limit defined by the flight manual is reached.

3.43.3. Compare maximum power available with power required for the intended hover heights. This comparison will determine the power margin for the operation. When the power margin is 5 psi or less, a second aircrew member will recompute TOLD to confirm power requirements. This check will not be performed on initial takeoff from the base field or while in departure corridors.

3.44. Training Power Requirements: (***NOTE:*** This requirement is not to be confused with the power available or required computation on TOLD; it will be confirmed by the instructor as an added safety precaution.)

3.44.1. Actual power available must be OGE or better to conduct training at remote training sites with unrestricted escape routes. That is, the aircraft has option to go around at any time during the approach.)

3.44.2. Actual power available must be OGE +3 psi or better to conduct training at remote training sites with restricted escape routes; that is, limited escape options once aircraft descends below the tree line.

3.44.3. If sufficient power is not available, the aircrew will lighten the helicopter, locate a more suitable landing site, or abort the mission.

3.45. Approach:

3.45.1. General Requirements. Prior to the approach, brief all crewmembers on the specific approach procedures, pilot's intentions, significant terrain features, specific crew requirements, intended landing point, and abort route. If at any time during the approach, the conditions do not appear favorable or safe, go around. ***NOTE:*** It is not uncommon to attempt numerous approaches prior to a safe landing.

3.45.2. Approach Planning:

3.45.2.1. Plan an abort route, preferably downhill and/or into the wind, without climbing. If it is necessary to turn during an abort, a right turn is preferable, terrain permitting. Never plan an approach to a confined area where there is no reasonable route of departure.

3.45.2.2. Avoid high rates of descent. Be alert for wind shifts and downdrafts. Monitor rotor rpm and power throughout the approach. Analyze wind and ground effect during the approach. Any landing site with obstacles on the upwind side will subject the helicopter to a null area (an area of no wind) or, in some cases, a downdraft. It is important to avoid this null area if marginal performance capabilities are anticipated.

3.45.2.3. Power-required performance charts have been developed for hovering over level, nonporous surfaces (TM 55-1520-210-10). Be aware of increased power requirements when hovering over tall grass, slopes, and obstacles in close proximity to the aircraft.

3.45.3. Unimproved Landing Area Problems. Helicopter landing mishaps often result from a vortex ring state or conditions requiring instantaneous power for recovery. Turbine engines require approximately 5 seconds to produce full power from a flat pitch. A vortex ring state will most likely occur when descent rates exceed 800 fpm during powered vertical descents where the airspeed is less than 30 knots. ***WARNING:*** To prevent the possibility of encountering a vortex ring state during unprepared area approaches, do not exceed 800 fpm descent rate when airspeed is less than 30 knots.

3.45.4. Types of Approaches:

3.45.4.1. Consider the height of obstacles when determining angle and direction of the approach. As the height of obstacle increases, larger landing areas or additional power will be required.

3.45.4.2. The transition period (transitioning from forward flight to hover flight) is the most difficult part of any approach. As helicopter performance decreases, an approach angle should be selected that will make the transition more gradual. Aircrews should establish a specific final approach entry altitude (for example, 300 feet) prior to attempting an approach to obtain a familiar sight picture.

3.45.4.3. The normal approach should be used in most cases.

3.45.4.4. A steeper-than-normal approach may be required for adequately clearing obstacles and avoiding null areas.

3.45.4.5. A shallow approach allows the rate of descent to be stopped prior to the loss of ETL, resulting in a smoother transition to a hover with fewer and smaller power changes.

3.45.4.6. A turning approach may be entered from any position in relation to the landing area. Maneuver and descend as necessary to a point on final where a controlled straight-in approach can be flown to the site. The point of rollout on final will vary with the entry point altitude and power reserve, but should be accomplished high enough to avoid the need for rapid flares, abrupt control movements, or large collective input. Low airspeeds while downwind should be avoided, especially in strong winds. High bank angle turns should also be avoided. Improperly executed descending turns can result in rapid loss of lift that may result in an inability to recover.

3.45.5. Confined Area:

3.45.5.1. A confined area approach need be no steeper than any other type of approach.

3.45.5.2. Some confined areas with high barriers will not allow the touchdown point to be kept in sight during the approach without using an excessively steep approach angle. A common problem associated with a steep approach over a barrier is that ETL may be lost prior to the helicopter entering ground effect. Depending on the sink rate, this may put the helicopter into a presettling with power or full settling with power condition.

3.45.5.3. Therefore, a confined area approach may be flown, using a normal approach angle to the top of the obstacles surrounding the site. This will allow the pilot to fly the approach to a simulated touchdown point. The approach will be flown as though an actual landing will be made above the obstacle. Once over the obstacle, the approach will be continued until the actual touchdown point in the forward usable third of the landing area is in sight. At this point, the rate of descent should be very low (less than 300 fpm), and the power for landing should be steadily increasing.

3.45.6. Pinnacle:

3.45.6.1. The first step for a pinnacle approach is to plan the approach to have an abort option. If you have to select between an approach with a left-quartering headwind or a right-quartering headwind, select the left-quartering headwind. This will result in less power required for the anti-torque system and thus a reduced overall power demand.

3.45.6.2. If power is marginal, avoid wind from the right but, if possible, plan your abort to the right. For the approach, position the skids of the helicopter (rather than your seat) over the site. Landing to your seat position could result in landing short of the intended area.

3.45.6.3. During the approach, the pilot may perceive a slight overarching on short final. He or she will use the low reconnaissance to practice the approach and pay attention to the approach angle, so as to anticipate the final approach.

3.45.6.4. The aircrew should be aware of the need for a rapid response to "go around" on a pinnacle approach. Rather than calling out the specific condition of a parameter, which may be out of tolerance (for example, "900 fpm"), the aircrew should call "go around." Aircrews should also expect the possibility of several aborted approaches because of the existing hazards and exacting requirements for a safe, successful approach.

3.45.7. Visual Illusions:

3.45.7.1. During an approach, be aware that uneven terrain surrounding the landing site gives poor visual cues of the actual aircraft altitude and rate of closure. For example, when the terrain slopes up to the landing site, a visual illusion occurs, making the aircraft appear too high and the rate of closure too slow. If the terrain slopes down to the landing site, the aircraft appears too low and the rate of closure too fast.

3.45.7.2. Be aware and overcome the temptation to make unnecessary control movements. Refer to the flight instruments during the approach to ensure a safe approach.

3.45.7.3. Simply meeting the parameters of the type of approach flown does not guarantee the success of the approach. The crew must continue to maintain the selected angle and control the rate of descent, especially during the last 100 feet.

3.45.7.4. Prior to decelerating below translational lift, the pilot should consider the altitude remaining and ensure the approach can be safely completed on the selected angle. Once translational lift is lost in a marginal power situation, the possibility of a go-around may not exist.

3.45.8. Light and Variable Winds:

3.45.8.1. Light winds normally allow you to take advantage of the best approach path based on terrain and obstacles. However, marginal power approaches, coupled with light and variable winds, can result in the pilot inadvertently placing the aircraft in a settling with power condition.

3.45.8.2. Light and variable wind conditions could result in a tailwind component on final approach, causing the pilot to add additional aft cyclic, thus placing the aircraft in a regime for which power is insufficient.

3.45.8.3. A pinnacle approach may add to the problem by denying the pilot apparent closure rate visual cues normally experienced over flat terrain. Due to the insidious onset of settling with power under these conditions, the pilot must ensure airspeed is maintained above ETL until committed to a landing or hover. Marginal power conditions and the existence of light and variable winds may dictate that an approach to a pinnacle not be attempted.

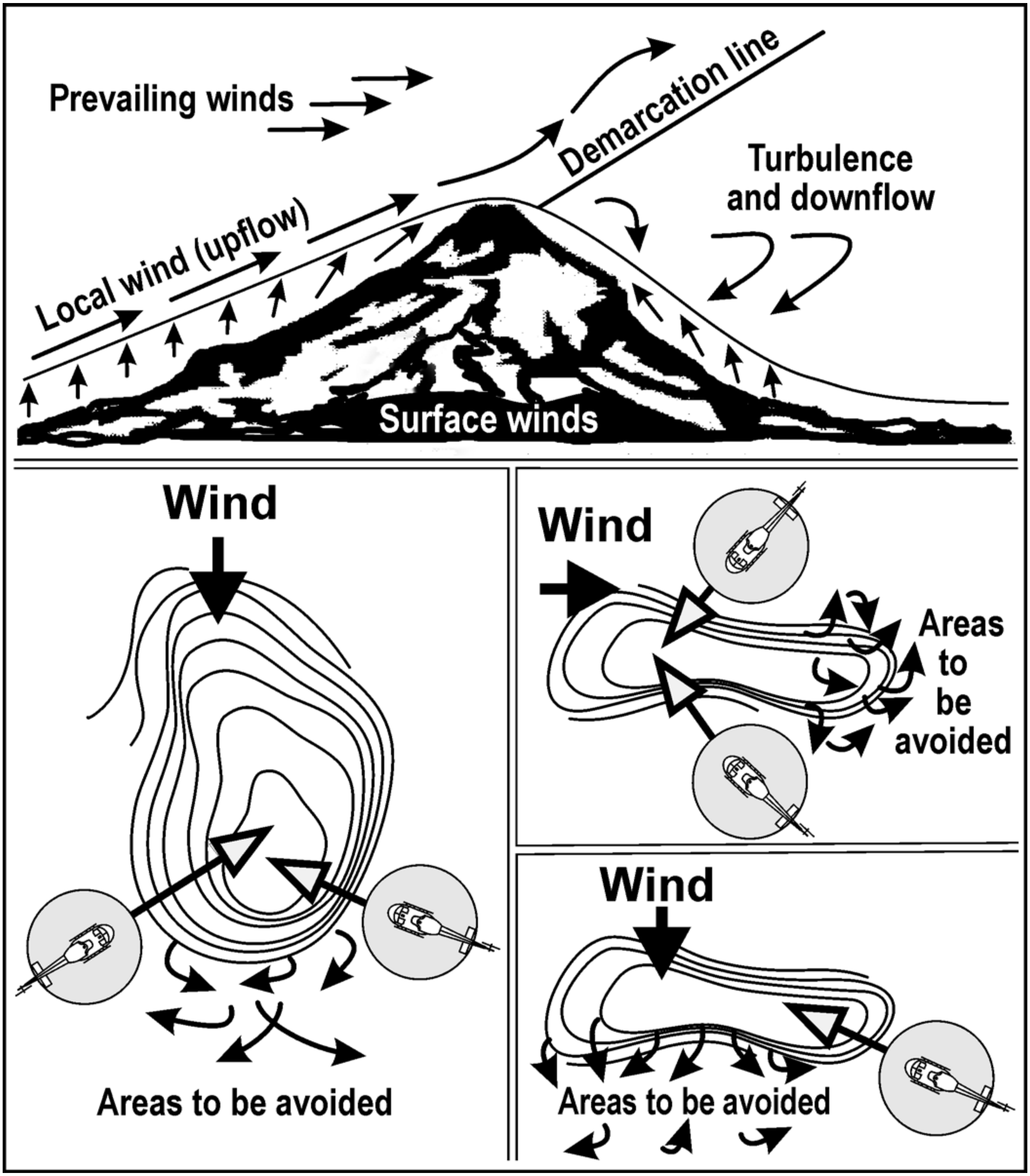
3.45.9. Moderate to Strong Winds:

3.45.9.1. To avoid the null area and associated turbulence downwind of a pinnacle, moderate to strong winds will normally require the use of a steeper than normal approach angle to be into the wind.

3.45.9.2. Use these winds to help you maintain ETL and prevent you from encountering the loss of ETL normally associated with steep approaches. Consider that a 10-knot wind blowing down a 5-degree slope will result in a downdraft component of approximately 88 fpm, but a 40-knot wind blowing down a 30-degree slope will result in a downdraft component of approximately 2,025 fpm. Do not allow the aircraft to fly through strong downdraft conditions when below ETL.

3.45.9.3. See Figure 3.1 for approach paths and areas to avoid.

Figure 3.1. Approach Paths and Areas To Avoid.



3.46. Go-Around Decision:

3.46.1. On short final, before the helicopter is committed to land, ensure you have proper rate of closure, rate of descent under control, and power smoothly increasing, but below hover power. If any variable is not meeting desired parameters, go around. If a go-around is executed in marginal conditions, the possibility of success is sharply reduced or nonexistent. Total crew involvement is paramount on all approaches to identify the need for a go-around prior to the go/no-go point. To successfully establish a climb, the "go-around" call must be made as soon as possible on the approach, but not later than the go/no-go point.

WARNING

Aborting to the right with a left crosswind may put the helicopter in a critical tailwind condition when a critical power requirement exists.

3.46.2. To initiate a go-around, apply sufficient power (the maximum power available, if necessary) to establish a climb and clear any obstacles. Accelerate to the maximum rate of climb airspeed as soon as practicable. When adequate airspeed and altitude are achieved, transition to a normal climb.

3.46.3. If the decision to go around is made too late to abort the approach and you are committed to land, hold maximum power and do not droop rotor below 319 rpm. (Excessive drooping of the rotor system may result in loss of tail rotor authority.) If you cannot stop your descent, select a spot and fly the aircraft as smoothly as possible to a touchdown. Do not make any abrupt movements of the controls. Attempt to smoothly fly the aircraft to your intended spot, knowing you cannot stop your descent. ***NOTE:*** The descent into ground effect may arrest your descent rate.

3.47. Obstacle Clearance. The aircraft commander has the ultimate responsibility for obstacle clearance. If possible, use additional crewmembers as scanners to assist the pilot. Ensure scanners are thoroughly briefed and aware of their duties and responsibilities involving obstacle clearance. If possible, post scanners on both sides of the helicopter. Prior to maneuvering the helicopter in close proximity to obstacles, make sure the area is clear. Whenever horizontal rotor clearance is 25 feet or less, the scanner should inform the pilot of the clock position relative to the nose of the aircraft and the estimated distance to the obstacle; for example, "Tree, nine o'clock, 20 feet."

3.48. Hover:

3.48.1. On arriving at a hover over an intended landing area, allow the helicopter movement to stabilize. Hovering over trees and uneven terrain requires additional power because full ground effect is not realized. Survey the landing area and determine the best landing spot. If possible, select a level area that is free from obstructions. Take care when landing in low brush. Small branches and bushes flatten with rotor wash. However, they could spring up into the rotor blades after reducing blade pitch to a minimum, reducing the engine to flight idle, or after shutting down the engines. Check for stumps, rocks, or depressions that could be hidden by grass or snow. Remember, there is very little clearance between the bottom of the aircraft and the ground.

3.48.2. When hovering over loose snow, sand, or dust, be prepared for an immediate takeoff. Blowing dust or snow may cause a loss of visual references and/or spatial disorientation. To avoid this, use a small tree, boulder, or other object as a reference point near your landing site. If visual references are lost, a transition to an instrument takeoff may be necessary.

WARNING

A steep approach to a touchdown in loose snow conditions can pose problems during the touchdown phase, especially if the ground is completely covered with snow. Obstructions and sloping or uneven terrain can be hidden. One technique to help reduce the potential for landing problems is to bring the aircraft into a high hover over the site. While maintaining a hover reference, slowly lower the aircraft to allow the rotorwash to clear away the snow and reveal the ground underneath. If at any time the hover reference is lost, initiate a restricted visibility ITO.

3.49. Landing. Lower the helicopter gently to the ground. (To prevent starting a fire, consider stowing landing and search lights in remote areas.) Maintain rotor rpm and check for complete aircraft stability before slowly decreasing collective pitch. Be ready for an immediate takeoff if the helicopter starts to tip. If excessive slope prevents a safe landing, lift off and reposition.

3.50. Remote Takeoff:

3.50.1. Recompute or confirm the power required to hover if you have added personnel or other weight to the helicopter. Complete the before-takeoff checklist, recheck the wind direction and velocity, determine the best departure route, and select a takeoff abort point. If the wind is light and variable, an inadvertent downwind takeoff could adversely affect aircraft performance. If takeoff power is reduced prematurely, safe obstacle clearance may be jeopardized.

3.50.2. In confined areas, attain airspeed to exit the AVOID area of the height velocity diagram as soon as possible. Avoid null areas, if possible, because a nearly vertical downdraft may be encountered that will reduce the climb rate.

3.50.3. Under a heavy load or limited power conditions, it is desirable to achieve ETL before encountering a null area and prior to climbing to improve overall climb performance.

3.50.4. Under certain combinations of limited area, high upwind obstacles, and limited power available, the best takeoff route may be crosswind. This is a departure from the cardinal rule of "take off into the wind," but it may be the right decision, all factors considered.

3.50.5. If whiteout or brownout conditions occur on takeoff, execute an ITO procedure. However, marginal power conditions may prevent establishing a significant climb prior to passing through ETL. In such cases, ensure the takeoff run is clear of obstacles before pulling power in a dusty area. Then perform a marginal power takeoff in accordance with TM 55-1520-210-10 (flight manual), using instrument references, if required, until reaching a speed that will allow a climb.

3.51. Tail Rotor Factors:

3.51.1. General. Anticipate conditions that can lead to loss of tail rotor authority during preflight planning. Also anticipate the possibility of adverse relative winds, whether natural or artificially produced. Avoid crosswinds or tailwinds when the aircraft is heavy and requires close to maximum power available.

3.51.2. Maximum Demands on the Tail Rotor. Maximum demands on the tail rotor occur with high density altitude—pressure altitude, temperature, and humidity—especially when combined with the following:

3.51.2.1. High gross weight.

3.51.2.2. Hovering OGE. ***NOTE:*** Uneven surfaces can cause part of the rotor system to be OGE.

3.51.2.3. Low airspeed, especially during takeoff when combined with a left turn.

3.51.2.4. Steep angles of bank while trying to maintain altitude and airspeed.

3.51.2.5. Confined areas due to loss of wind for ETL caused by descending below a tree or ridge line.

3.51.2.6. Any maneuver requiring high power.

3.51.3. Loss of Tail Rotor Effectiveness. Avoid situations that will cause the tail rotor to exceed its ability to produce adequate thrust. Monitor power requirements and apply power carefully. Early recognition of loss of tail rotor effectiveness is essential to successfully and safely initiating corrective action. Four conditions contribute to loss of tail rotor effectiveness, as follows:

3.51.3.1. High Power:

3.51.3.1.1. Any maneuver that requires high power and, therefore, high tail rotor thrust can cause loss of tail rotor authority. When the rotor system demands more power than the engines can produce, the main and tail rotor rpm will begin to decay. As the tail rotor rpm decays, there is insufficient thrust available to maintain heading, causing the nose of the aircraft to yaw to the right. Left pedal corrections at this point will only continue to aggravate the situation.

3.51.3.1.2. If a tail rotor stall occurs, it will cause an abrupt yaw to the right. To recover, lower the collective, increase airspeed, initiate a right turn (if possible), and go around. Adding right pedal, if possible, may allow for quicker recovery. In order for the recovery to be successful, the situation must be recognized early enough to ensure sufficient altitude for a safe go-around.

3.51.3.2. Decelerative Attitude and Low Airspeed. A decelerative attitude may result in a combination of downwash from the main rotor and turbulence from the synchronized elevator passing through the tail rotor. Low airspeed and high power settings also increase main rotor turbulence through the tail rotor. Both cases will require more left pedal to maintain aircraft heading, which could increase the potential for loss of tail rotor effectiveness in some situations.

3.51.3.3. Left Crosswind, Left Sideward Flight, or Right Pedal Turn. These conditions could cause the tail rotor to operate in turbulence similar to the main rotor during a vortex ring state. Left sideward velocities of 5 to 35 knots or left crosswinds (dangerous velocities decrease with increased aircraft loading) can cause the tail rotor to work in its own rotor wash. As a result, it will be difficult to maintain directional control due to large variations in tail rotor thrust. These phenomena are referred to as vortex ring state and tail rotor breakaway. To correct the problem, slow or stop sideward flight, initiate a pedal turn, or gain airspeed.

3.51.3.4. Right Crosswind, Right Sideward Flight, or Left Pedal Turn. Right relative wind acting on the fuselage tends to push the tail to the left, which requires more tail rotor thrust to maintain heading. As the aircraft is flown at higher gross weights, higher right relative winds, higher density altitudes (DA), higher humidity, etc., full left pedal may be exceeded. To correct the situation, gain airspeed and/or initiate a right turn, if possible. Running out of left pedal is the most common tail rotor problem encountered.

3.52. Turbulent Air Flight Techniques. Constantly evaluate and avoid areas of severe turbulence. However, if severe turbulence is encountered, take immediate steps to avoid continued flight through it. To prevent exceeding the structural limits of the helicopter, follow the procedures in TM 55-1520-210-10 (flight manual).

3.52.1. Orographic Turbulence:

3.52.1.1. The most frequently encountered type of turbulence is orographic turbulence. This turbulence is normally associated with updrafts and downdrafts and can be dangerous if severe. It is created by moving air being lifted or depressed by natural or manmade obstructions. It is most prevalent in mountainous regions and rough terrain.

3.52.1.2. The severity of orographic turbulence is directly proportional to the wind velocity. It is found on the upwind side of slopes and ridges, near the tops, and extending down the downwind slope. Its extent on the downwind slope depends on the strength of the wind and the steepness of the slope.

3.52.1.3. If the wind is fairly strong (15 to 20 knots) and the slope is steep, the wind generally will blow off the slope and not follow it down. However, there will still be some tendency to follow the slope. In this situation, there will probably be severe turbulence several 100 yards downwind of the ridge at a level just below the top of the ridge. Under certain atmospheric conditions, a cloud may be observed at this point. On more gentle slopes, the turbulence will follow down the slope, but will be more severe near the top.

3.52.1.4. Orographic turbulence will be affected by other factors. For example, its intensity will not be as great when climbing a smooth surface as when climbing a rough surface and it will not follow sharp contours as readily as gentle contours.

3.52.2. Convective Turbulences. Rising air currents created by surface heating causes convective turbulence. This is most prevalent over bare areas. Convective turbulence is normally found at a relatively low height above the terrain, generally below 2,000 feet. Under certain conditions, it may reach as high as 8,000 feet. Turbulence may be anticipated when transitioning from bare areas to areas covered by vegetation. Increasing altitude will decrease turbulence and provide a smoother flight.

Section 3E—Night Operations (Unaided)

3.53. Altitude Restrictions. Minimum en route altitude for unaided night navigation is 500 feet above the highest obstacle within 5 nautical miles (nm) of the route of flight. However, published helicopter routes may dictate lower altitudes.

3.54. Illumination Requirements for Helicopter Landing Areas. Operations into unimproved sites between official sunset and official sunrise will be made only if (1) the area is outlined by discernible lights or (2) the pilot can clearly see the approach path and landing surface (as would be possible immediately after official sunset or before sunrise).

3.55. Aircraft Lighting Requirements. Night operations require one fully operative white landing or search light.

3.56. Crew Coordination. Mandatory calls for the PNF the aircraft are:

3.56.1. During night VFR descents, 1,000 feet above intended altitude, 500 feet above intended altitude, 100 feet above intended altitude, and intended altitude.

3.56.2. On final approach, advisory calls every 100 feet when above 300 feet AGL and every 50 feet when below 300 feet AGL. The advisory will include altitude and airspeed and, at the pilot's discretion, descent rate and power applied--in that order (for example, "250 feet, 40 knots, sink 500, torque 15").

3.56.3. On final approach, rates of descent greater than 500 fpm; "go-around" if rate of descent exceeds 800 fpm.

3.57. Night Approaches to Unimproved Sites:

3.57.1. Do not leave flight altitude until the location of the LZ has been positively identified. If adequate lighting is available, brief and conduct a site evaluation prior to the approach much the same as under daylight conditions. Do not, under any circumstances, conduct a low reconnaissance and do not descend below 300 feet AGL until established on the approach.

3.57.2. Knowledge of the area in general, known hazards, and terrain features from briefings or charts are determining factors on how to conduct the evaluation. Prior to making the first approach, determine wind direction. Forecast winds may be used when wind direction cannot be determined otherwise. When using forecast winds, ensure an adequate power margin is available in the event winds differ from forecast.

3.57.3. Use the type of approach best suited to the situation. Adjust the pattern altitude accordingly, but no lower than 300 feet AGL on downwind. Throughout the approach, use the altimeter to maintain awareness of aircraft height above the ground.

3.57.4. Establish final approach to commence at no lower than 300 feet AGL. Cross-reference instruments throughout the approach to reach approximately 200 feet AGL with an approximate ground speed of 30 knots. During the last 100 feet of the approach, limit the rate of descent to 300 fpm. Approaches at night will generally be flown with slightly slower rates of descent and closure rates than during daylight operations. As closure rates decrease, the time the aircraft remains in the unsafe area of the height velocity envelope increases.

3.57.5. The decision to make an approach to a hover or a touchdown is based on power available and landing site condition.

3.58. Site Selection for Training:

3.58.1. Night training should include operations to unimproved sites.

3.58.2. The minimum LZ size is 3 rotor diameters. Sites will be selected where the vertical development of the surrounding terrain does not restrict the pilot's option to execute a go-around, with minimum maneuvering, at any point during the approach.

3.58.3. The obstacles or terrain within 3 nm of the site will not exceed 200 feet above the site elevation. To satisfy this requirement, restrict the approach and departure route to directions that will avoid terrain or obstacles exceeding the above criteria.

3.58.4. The 23 FTS will list eligible night landing sites and include applicable restricted approach and departure routes in the IFG.

3.58.5. For sites without permanent lighting, prior to full darkness, make a visual survey of the site and position lights to outline the landing area. Check for obstacles, general site condition, and wind. This survey may be accomplished by other crews flying during the day or by the ground party. After darkness, NVG-equipped crews may accomplish a survey.

3.59. Landing Zone (LZ) Lighting:

3.59.1. Some type of LZ lighting should be used to help the pilot locate and identify the LZ and make a landing at night. Lighting aids, including terminal guidance systems, expeditionary lights, flare illumination, and makeshift light sources (vehicle lights, flashlights, strobe lights, bonfires, smudge pots, etc.), have been used successfully. Surface vehicle headlights are an excellent lighting source provided they do not blind the pilot during the approach.

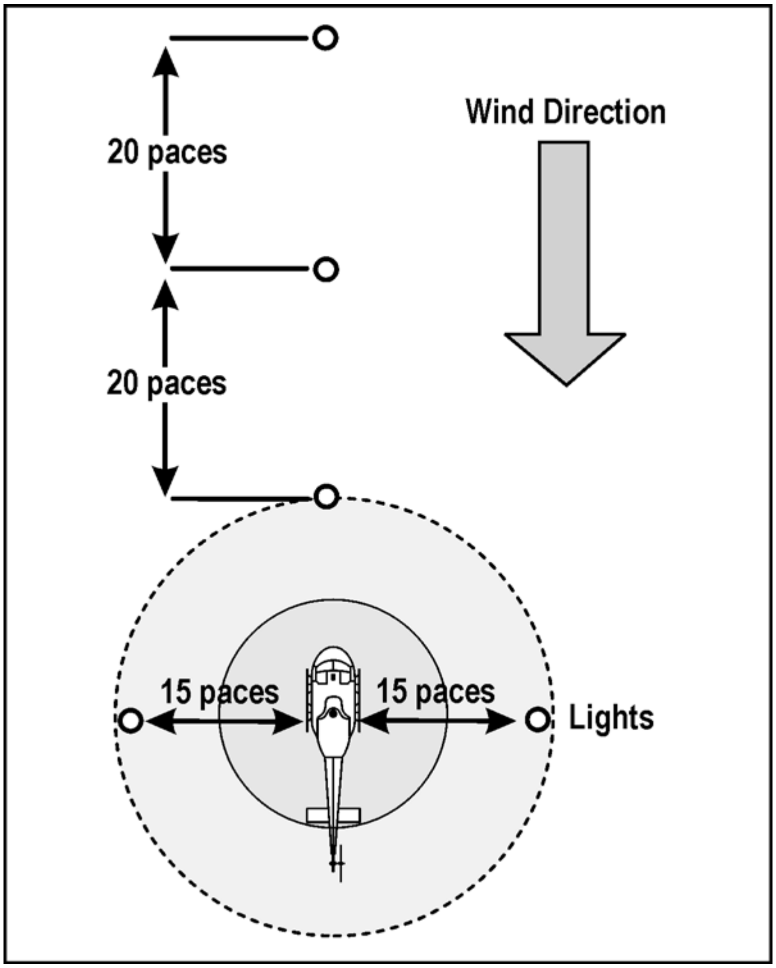
3.59.2. When practical, a standard LZ lighting pattern should be employed. LZ lighting should be visible to the pilot, identify an area free of obstacles and safe for hovering and landing, employ three or more lights at least 15 feet apart to prevent autokinetic illusions, and provide orientation along an obstacle-free corridor for landings and takeoffs.

3.60. LZ Lighting Patterns:

3.60.1. Because a variety of LZ lighting patterns are in use, the pilot should anticipate diversity in lighting patterns when participating in joint and/or combined operations.

3.60.2. The inverted Y light system is an excellent way to identify LZs. Lights for the inverted Y will normally be spaced in compliance with Figure 3.2. When set up in this fashion, the inverted Y provides visual cues to determine the correctness of the glide angle by observing the apparent distance between the lights in the stem of the Y.

Figure 3.2. Inverted Y Light System.



3.60.3. If the lights in the stem appear merged into a single light, a shallow glide angle is indicated. If the lights in the stem appear to increase in distance apart, the approach is becoming steeper.

3.60.4. Approach path lineup corrections can also be made, using the stem of the Y. For example, if the stem points to the left, the helicopter is left of course and should correct to the right. In addition, the following guidance applies:

3.60.4.1. The direction of the approach is into the open end of the Y.

3.60.4.2. The touchdown area is outlined by the triangle formed by the three lights marking the open end of the Y.

3.60.4.3. When set up properly, wind direction will be along the stem of the Y.

Section 3F—Night Operations (NVG)

3.61. Crew Complement. The entire crew should be either on or off NVGs. If one crewmember is off NVGs, the entire crew should abide by the criteria in Section 3E. All crewmembers should use the same type and model NVG.

3.62. Ambient Illumination Requirements:

3.62.1. NVGs work best with ambient illumination levels above 5 percent equivalent moon illumination (EMI). Clear moonless nights with average starlight provide approximately 8 percent EMI.

3.62.2. To determine actual ambient illumination levels, aircrews should give consideration to the illumination level and position of the moon, starlight, ground lights, and any atmospheric conditions that may reduce the available ambient light. When cloud cover obstructs the moon and stars, aircrews should use their experience and judgment to estimate the amount of ambient light available.

3.62.3. Training will not be conducted with less than 5 percent EMI.

3.63. Altitude Restrictions. The minimum en route altitude is 200 feet AGL in surveyed low-level areas. Published helicopter routes may require lower altitudes.

3.64. Exterior Aircraft Lighting:

3.64.1. An operable white light (landing or search) is required for all NVG flights.

3.64.2. Position lights will be set to steady bright during flight. ***NOTE:*** The anticollision light may be extinguished and the position lights set to dim during terminal area operations if they create a hazard to the aircrew.

3.64.3. The lead will operate with position lights in STEADY, DIM mode. Number 2 will operate with position lights in STEADY, BRIGHT mode and carry the anticollision light on. If any aircraft departs the formation, lights will be set to STEADY, BRIGHT mode and anticollision light will be on.

3.64.4. An operable searchlight or landing light equipped with an infrared filter is <u>required</u> for NVG training flights below 20 percent EMI and is highly <u>recommended</u> for all NVG flights.

3.65. Interior Aircraft:

3.65.1. Aircraft interiors will be painted flat black. All interior lights will be NVG compatible, taped, or turned off. Lights of the wrong frequency (red, white, or any other non-NVG-compatible frequency) will bathe the cockpit and/or cabin area with light that degrades the visual acuity of the NVGs. However, this degradation in performance may go completely unnoticed by the aircrew.

WARNING

Use extreme caution when using laser pointers. Do not use the pointer in such a way that stray light will enter the aircraft in any way. Do not use the pointer if personnel are known or suspected to be on the ground in the vicinity to be designated. Do not point the pointer at other aircraft. Failure to follow these restrictions may result in eye damage to personnel and will potentially impact the safety of aircraft operations.

3.65.2. Ensure critical information is not rendered invisible by excessive taping. The tape must allow enough light to be emitted to alert the pilot of critical information.

3.65.3. Each crewmember will carry an NVG-compatible light source (flashlight, chemical light, etc.).

3.66. Site Selection for Training. Sites will be selected where the vertical development of the surrounding terrain does not restrict the pilot's option to execute a go-around with minimum maneuvering at any point during the approach. Minimum LZ size is 3 rotor diameters.

3.67. Flight Planning:

3.67.1. Flight planning is particularly important for NVG operations. Comply with all low-level flight planning requirements, such as preparing maps, preparing the navigation log, and determining MSAs.

3.67.2. Comply with the NVG preflight procedures in the NVG TO (TO 12S10-2AVS9-2, *Maintenance Manual—Intermediate with Illustrated Parts Breakdown, Image Intensifier Set, Night Vision, Type AN/AVS-9[V]).* Do not fly with NVGs that fail to meet visual acuity requirements.

3.67.3. The unique attributes of NVGs require special consideration when planning a flight. Flights conducted in marginal ambient light conditions (less than 20 percent EMI) must be carefully planned to account for substantial decreases in visual acuity and depth perception and increased difficulty in terrain avoidance. The following items are important to highlight:

3.67.3.1. Reduced visual acuity makes singular objects or terrain features difficult to perceive. Power lines, unlit towers, poles, dead trees, etc., are extremely difficult to see, especially against dark backgrounds. Lower en route altitudes within the established minimum parameters are recommended to enhance visual acuity.

3.67.3.2. Precipitation and atmospheric moisture are not easily visible. Adverse weather may appear much farther away than it actually is or may not be seen at all. Haze, smoke, clouds, fog, rain, and low outside illumination due to overcast conditions or lack of ground lights will diminish NVG effectiveness.

3.67.3.3. Wind direction and velocity are difficult to discern while flying in low-light conditions.

3.67.3.4. Depth perception is degraded when using NVGs.

3.67.3.5. Lights are indistinguishable by color. Red warning lights look like all other lights.

3.67.3.6. Bright lights will reduce the gain of the NVGs, making objects in dark fields of view nearly invisible.

3.68. Terminal Area Operations:

3.68.1. Do not leave en route altitude until reaching the terminal operations area. Brief and conduct an unprepared site evaluation prior to the approach IAW daytime unimproved site procedures as shown in Section 3D (except low-level flight).

3.68.2. Approaches at night are generally flown with slower rates of closure and descent than approaches during the day. As closure rates decrease, the time the aircraft remains in the unsafe area of the height velocity envelope increases. Coordinate advisory calls and visual cues throughout the approach to reach approximately 200 feet AGL with an approximate ground speed of 30 knots. During the last 100 feet of the approach, limit the descent rate to approximately 300 fpm. During the final approach, consider using the infrared searchlight to enhance visual cues.

3.69. Crew Coordination:

3.69.1. Cruise flight on NVGs is similar to unaided cruise flight. The PF is primarily responsible for aircraft control the PNF navigates, and the scanner provides terrain and obstacle clearance inputs. The PNF will monitor the gauges and keep the crew informed of the aircraft's position, significant obstacles, and mission progress.

3.69.2. Crew coordination during terminal operations is critical. The entire crew will help each other maintain orientation to the landing site while in the pattern. Dropping chem-sticks during high and low reconnaissance may help establish a reference point for identifying the intended landing spot.

3.69.3. During the approach, the crew will make advisory calls IAW paragraph 3.56.

3.69.4. Reduced peripheral vision degrades the ability to perceive motion, especially while in a hover. Closure rate, descent rate, hover drift, and altitude must be consciously and deliberately perceived because peripheral and instinctive analysis are insufficient. Frequent, deliberate head-turning to examine groundspeed and hover drift is required. Scanners are particularly valuable in helping the PF with early detection of excessive closure rates, descent rates, and any unintended drift. The scanner's primary duties are obstacle clearance, hover altitude reference, and drift detection.

Section 3G—Formation Procedures

3.70. General. The primary purposes of helicopter formation flight are mutual support and control and increased lift capability. In addition, formation flight enhances maneuverability and flexibility. If more than three aircraft are required, consider breaking into smaller elements. The minimum separation between the closest portions of any two helicopters in any formation is 1 rotor diameter, but the tactical situation will usually dictate more separation. Vertical stepup or stepdown is optional for each succeeding helicopter. The formation will not be flown in marginal weather conditions.

3.71. Responsibilities. Every flight member has specific responsibilities that directly affect the safety and mission of the entire formation, as follows:

3.71.1. Flight Lead. Flight lead is responsible for the conduct of the formation and must know and consider the capabilities of all members of the flight. Flight lead is also responsible for the following:

3.71.1.1. Briefing the flight covering, as a minimum, those items contained in the formation briefing guide in the IFG that are applicable to the sortie.

3.71.1.2. Maintaining formation integrity and air discipline.

3.71.1.3. Directing radio channel changes.

3.71.1.4. Making radio calls.

3.71.1.5. Navigating.

3.71.1.6. Ensuring formation clearance from other aircraft and hazards.

3.71.1.7. Directing all formation changes.

3.71.1.8. Conducting a post-mission formation debriefing.

3.71.2. Wingman. The wingman is responsible for the following:

3.71.2.1. Verifying the accuracy of the mission planning.

3.71.2.2. Being prepared to assume responsibilities as the formation leader.

3.71.2.3. Maintaining position in the formation and advising flight lead when it is necessary to deviate from any directed position.

3.71.2.4. Acknowledging radio channel changes by position prior to initiating the action.

3.71.2.5. Navigating and ensuring terrain or obstacle clearance independent of lead.

3.71.2.6. Backing up flight lead where necessary and being able to assume the lead if required.

3.71.2.7. Notifying lead if visual contact with formation aircraft is lost, flying safety is jeopardized, or radio failure occurs.

3.71.2.8. Questioning flight lead any time a significant deviation occurs that may jeopardize mission accomplishment.

3.71.3. Crewmembers. Each crewmember is responsible for providing mutual coverage for other aircraft in the formation. This includes scanning the 6-o'clock position of other helicopters in the formation because rear visibility is extremely limited. Scanners are also responsible for notifying the pilot of all changes in the relative position of other aircraft in the formation.

3.72. Safety Considerations:

3.72.1. "Knock-It-Off" Call:

3.72.1.1. This is a radio call any formation member can make to terminate maneuvering for any reason. It is particularly applicable when a dangerous situation is developing. This radio call applies to all phases of flight and all types of formation maneuvers. All formation members must acknowledge this call, in turn; for example, “Blue 90 flight, knock-it-off.” Regardless of who made the call, lead will acknowledge with the call, “Blue 90 lead, knock-it-off,” followed by the wingman’s call “Blue 90 2, knock-it-off,” etc.

3.72.1.2. If an aircraft in the formation subsequently loses sight of the formation, the appropriate lost visual radio call should be made and lost visual procedures initiated.

3.72.1.3. If lead has the wingmen in sight and the situation requires immediate aircraft separation, lead should maneuver to ensure aircraft separation. Lead will direct a rejoin only after the wingmen are in a position where a safe rejoin can be accomplished. The wingmen should maintain a minimum of 1,000 feet separation between aircraft until directed to rejoin.

3.72.2. “Break Out” Call:

3.72.2.1. Wingmen must break out of formation when directed by lead, when unable to maintain sight of lead or the preceding aircraft, when unable to safely rejoin or remain in formation without crossing under or in front of lead or the preceding aircraft, or anytime their presence constitutes a hazard to the formation.

3.72.2.2. When breaking out of formation, each wingman will clear in the direction of the break and notify lead of the intent to break and the direction of break. If he or she is breaking out due to a lost visual situation, each wingman will break away from either lead’s or the preceding aircraft’s last known position, the direction of turn, or in any direction that ensures immediate separation. Lead will continue the current maneuver with the current power setting to aid in aircraft separation. If the wingman is in sight, lead should also maneuver to obtain separation, whenever possible. After obtaining safe separation and when no further complications exist, the wingman may request a rejoin.

3.73. Dissimilar Formation. Formation flights with dissimilar aircraft are authorized when all participating crewmembers are briefed and thoroughly familiar with the other aircraft’s performance and tactics. Rotor disk (RD) separation will be based on the largest rotor disk diameter.

3.74. Communications Check. Prior to formation flight, conduct a communications check of all aircraft in the formation. Lead will direct an abort for any aircraft failing the check if mission requirements dictate.

3.74.1. Radio Procedures:

3.74.1.1. After initial radio contact has been established between aircraft, lead is responsible for all calls pertaining to the flight.

3.74.1.2. Only lead will initiate frequency changes. Lead may prebrief way points for communication changes. A sequence sheet or communications plan indicating timing and/or locations for frequency changes and communications check-ins will reduce confusion and enhance mission execution, particularly during communications-out procedures.

3.74.1.3. Each wingman will acknowledge (by his or her position in the flight) a frequency change prior to switching to the new frequency or as briefed. Throughout the formation mission, an acknowledgment of a frequency change indicates all checklists are complete and the wingman is ready for the next event. If the wingman is not ready, the reply will be “stand by.” The frequency will not be changed until all wingmen have made the normal acknowledgment.

3.74.1.4. Lead will check in on the new frequency, followed by all wingmen in order or as briefed.

3.74.1.5. If a wingman fails to check in after a reasonable length of time, lead will attempt to contact him or her on another radio. If this fails, lead will direct members of the flight back to the previous (or prebriefed) frequency to reestablish contact. As a last resort, lead will initiate a prebriefed chatter mark or a brief radio call on guard frequency in order to establish contact on a prebriefed frequency.

3.74.1.6. The pilot and copilot in each aircraft in the flight will monitor the interplane frequency.

3.74.1.7. Only essential transmissions will be made. Strict radio procedures and discipline must be enforced to avoid jeopardizing safety and mission effectiveness.

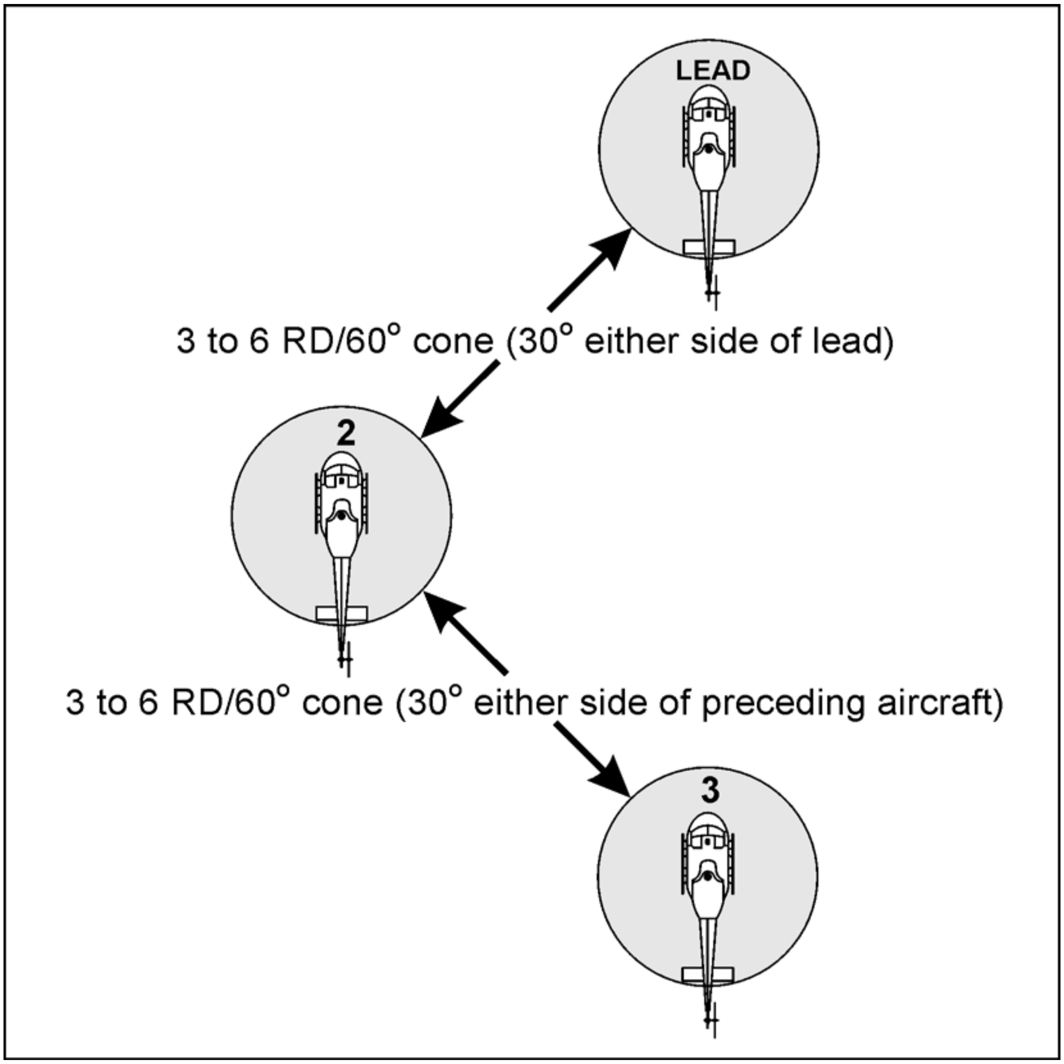
3.74.2. Signals. The formation signals in AFI 11-205, A*ircraft Cockpit and Formation Flight Signals,* will be used. Additional signals may be used if prebriefed.

3.75. Types of Formation. The mission determines the type of formation most suitable for the flight. For cross-country, deployment, or redeployment flights, primary consideration should be given to crew fatigue. Unless otherwise specified, formations can be flown low level or above 500 feet AGL. In low-level situations, the formation should allow lead to maintain flight integrity and still maneuver the flight with few restrictions. In all low-level formations, it is each wingman's responsibility to maintain a position that does not restrict lead's (or the preceding aircraft's) ability to maneuver. The following formations are authorized:

3.75.1. Trail Formations:

3.75.1.1. Fluid Trail. This formation, shown in Figure 3.3, is recommended for cross country or deployment flights and may be used in day low-level situations. Minimum lateral separation is one RD (3 RD when below 500 feet AGL). Wingmen will maneuver in the 60-degree quadrant aft (30 degrees left or right) of the preceding aircraft. They should be in a position to see both the preceding aircraft and the terrain being flown over without having to make head movements to reduce the possibility of contact with obstructions and maximize lead's maneuverability.

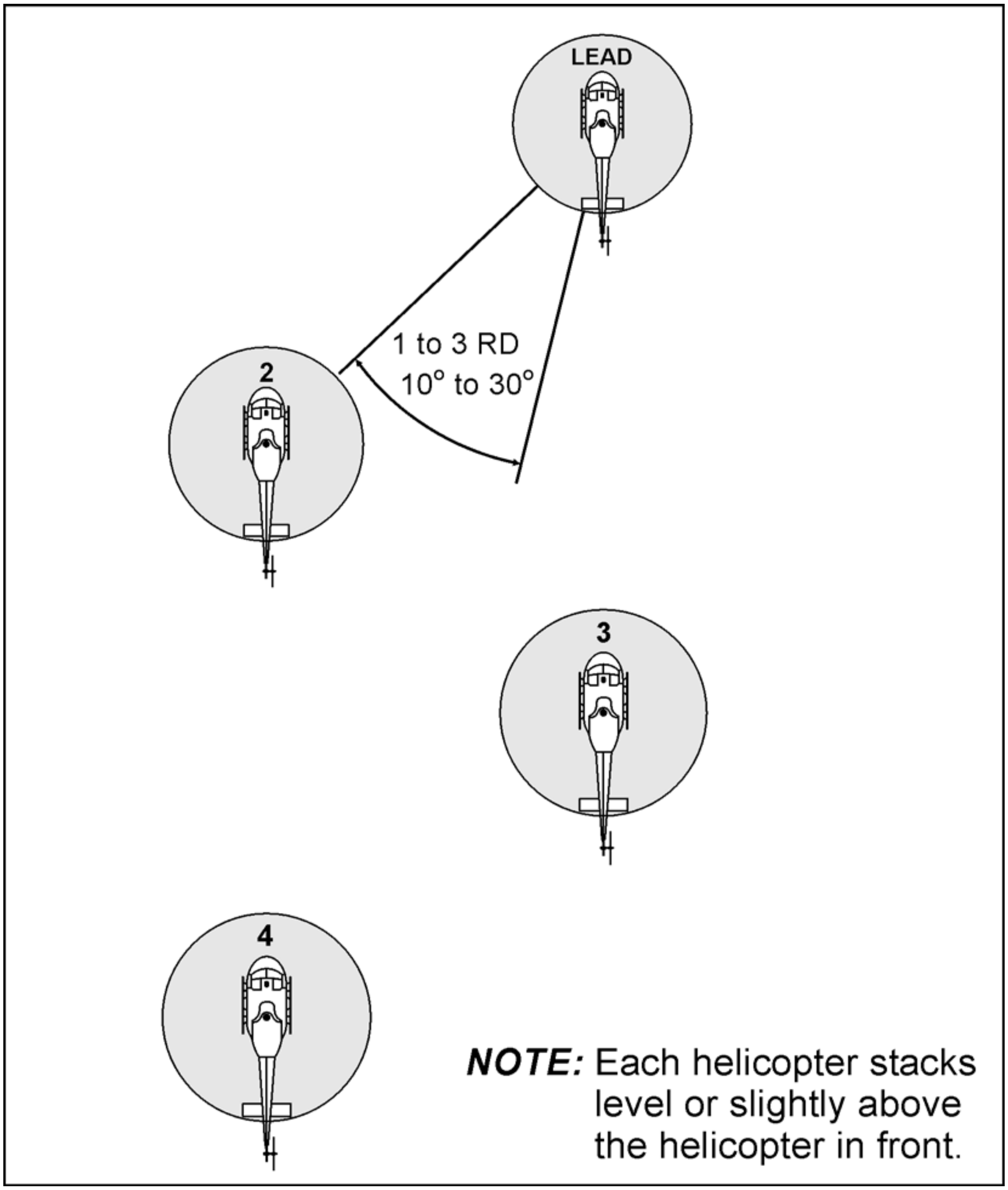
Figure 3.3. Fluid Trail Formation.



3.75.1.2. Fixed Trail. Lead may direct the fixed trail formation when terrain or maneuvering dictates. When directed to a fixed trail formation, aircraft will line up directly behind and stacked slightly above preceding aircraft. The fixed trail formation should be avoided for extended periods of time because closure rates are difficult to detect. Maneuvers should be limited to those necessary for landing alignment in the LZ. Minimum separation is 1 RD (3 RD when below 500 feet).

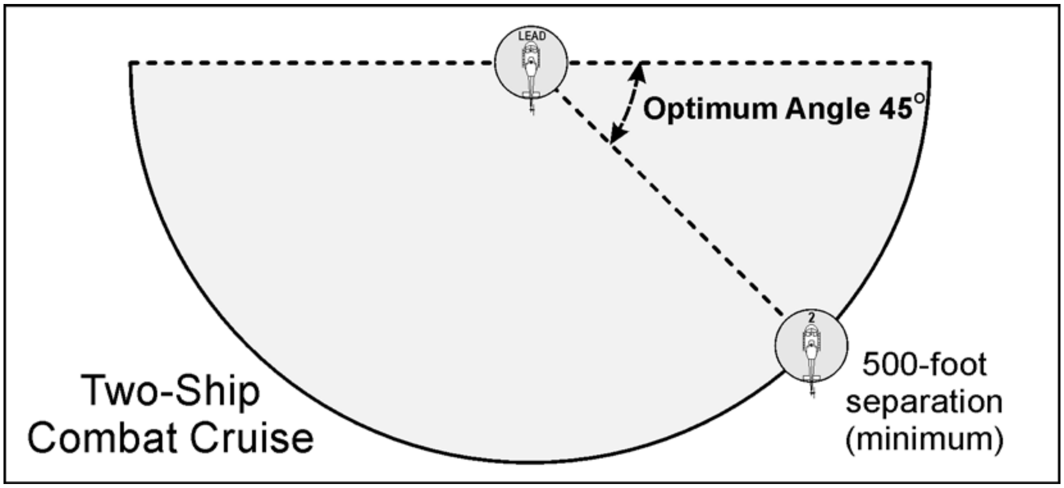
3.75.2. Staggered Formation. This formation allows lead more control of the flight. It is especially useful during terminal area operations. Lead may direct a right- or left-staggered formation. Figure 3.4 depicts a left-staggered formation. In a right-staggered formation, aircraft numbers 2 and 4 are positioned on the right side of lead. Odd-numbered aircraft remain directly behind lead, and even-numbered aircraft position themselves 10 to 30 degrees aft of the preceding aircraft. Each aircraft stacks level or slightly above the preceding aircraft. Lateral separation is 1 to 3 RD. When this formation is used below 500 feet AGL, minimum separation is 3 RD.

Figure 3.4. Staggered Formation.



3.75.3. Combat Cruise Formation. As shown in Figure 3.5, this formation is designed for low-level, tactical flight. It is similar to fluid trail and offers some of the same advantages. Lead may maneuver as desired, and wingmen may position themselves to keep preceding aircraft and upcoming terrain in view simultaneously. Wingmen will maneuver on an arc from the 3- to 9-o'clock position off the preceding aircraft. The optimum position is 45 degrees either side astern of the preceding aircraft. Minimum separation is 500 feet between all aircraft. At the initial point (IP), lead may direct a tighter formation (fluid trail or staggered).

Figure 3.5. Combat Cruise Formation.



3.76. Engine Start and Taxi. Start engines by visual signal, radio call, or as prebriefed. Prior to requesting taxi clearance, flight leads will check in the flight. (This does not apply to communications out.) The flight will normally taxi in order with a minimum of 100 feet of spacing from the main rotor to the tail rotor.

3.77. Lineup for Takeoff:

3.77.1. Lead will normally taxi to the downwind side of the takeoff area or runway to permit lineup and hover checks. Lead must allow adequate room on the takeoff area for all formation members to maneuver.

3.77.2. Spacing should be commensurate with helicopter type and conditions (minimum of 1 RD). Increased spacing may be required in certain situations, such as heavy gross weights or dusty conditions.

3.78. Takeoff. There are two types of formation takeoffs—wing and delayed. Either type may be initiated from the ground or a hover, as follows: (***NOTE:*** The type of takeoff will be prebriefed.)

3.78.1. Wing Takeoff. Aircraft will take off simultaneously, maintaining formation separation (normally 5 seconds after a takeoff radio call is completed). Lead may be required to hold a slightly lower than normal power setting (for example, in ground effect [IGE] +3 psi) to enable the wingmen to maintain position without requiring excessive power.

3.78.2. Delayed Takeoff. Lead will initiate the takeoff. Each wingman will delay executing the takeoff as briefed (normally 5 seconds after the previous aircraft). Lead will climb at the briefed airspeed and rate of climb (70 KIAS and 500 fpm for training).

3.79. Aborts:

3.79.1. Prior to takeoff, an aborting aircrew will notify lead, clear the formation (as appropriate), and return as directed.

3.79.2. If an abort occurs during takeoff, the aborting aircrew will (1) call flight call sign, (2) position, (3) abort, and (4) state its intentions; for example, "Blue 49 Flight, two, aborting, straight ahead." Aborting aircrew will turn on an anticollision light at night. If possible, the aborting aircrew will maintain the side of the formation they were on when the takeoff was started. The aborting aircrew is responsible for avoiding any aircraft in front of them.

3.79.3. Other aircraft may continue takeoffs or delay as the situation dictates.

3.79.4. If an abort occurs, all other aircraft will assume a new position (maintaining the original formation's call sign) and complete the mission as briefed. With the permission of lead, a spare aircraft or the aborting aircraft may rejoin the formation in last position.

3.80. Rejoin. Unless prebriefed or directed by lead, wingmen will request permission to rejoin. Lead will direct which type of rejoin to be used. (***NOTE:*** Although "join-up" and "rejoin" speak of different events, the procedure is the same for both and the terms will be used interchangeably here.) Types of rejoins are as follows:

3.80.1. Straight Ahead Rejoins. Lead will establish a heading while wingmen accelerate until established in position. ***NOTE:*** If an overshoot becomes unavoidable, the joining aircraft should reduce power, raise the nose to decelerate, and, if necessary, turn slightly away from the formation, keeping lead (or the preceding aircraft) in sight. If an overshoot occurs, the overshooting aircraft should fly away from the flight, maintain 1,000 feet of separation, and request permission to rejoin.

3.80.2. Turning Rejoins. Lead will establish an angle of bank no greater than 15 degrees. Wingmen will then turn inside of lead (or the preceding aircraft) until they are established in position. ***NOTE:*** If an overshoot becomes unavoidable, the joining aircraft should pass behind the preceding aircraft so as not to lose visual contact. It should never pass directly under or over any other aircraft in the formation.

3.80.3. Night Rejoins. Extreme caution must be exercised during night join-ups, especially turning join-ups and rejoins, due to the difficulty in estimating distance and closure rate. All formation aircraft must maintain prebriefed parameters (airspeed, heading, and angle of bank). After takeoff, wingmen will maintain visual contact with lead. Lead will adjust lights as requested by wingman.

3.81. En Route. Formations will be flown with a maximum of five aircraft per element to ensure safe lost visual contact procedures.

3.82. Changing Formation. Unless the crew is briefed otherwise, lead will direct all formation changes. Number 2 may change position within the set formation as required to reduce pilot fatigue, provide terrain clearance, etc. If lead desires a formation change, radio, light, or visual signals may be used to change the formation. For all verbally directed formation changes, lead will state the flight call sign and type of formation to assume (for example, "Blue 05 Flight, go left staggered"). For formations without a scanner, the last wingman in the flight will call in when the formation change is complete.

3.82.1. Crossover. Wingmen will maintain appropriate clearance. They will climb slightly above preceding aircraft and use a heading change of approximately 5 degrees to cross from one side to the other. Once Number 2 changes, all corresponding aircraft will move to establish the new formation. For example, if the formation is staggered left and Number 2 moves to the right, all even-numbered positions will move to the right with the odd-numbered positions maintaining their position behind the lead aircraft.

3.82.2. Lead Change (Figures 3.6 and 3.7):

Figure 3.6. Lead Change from a Left-Staggered Formation.

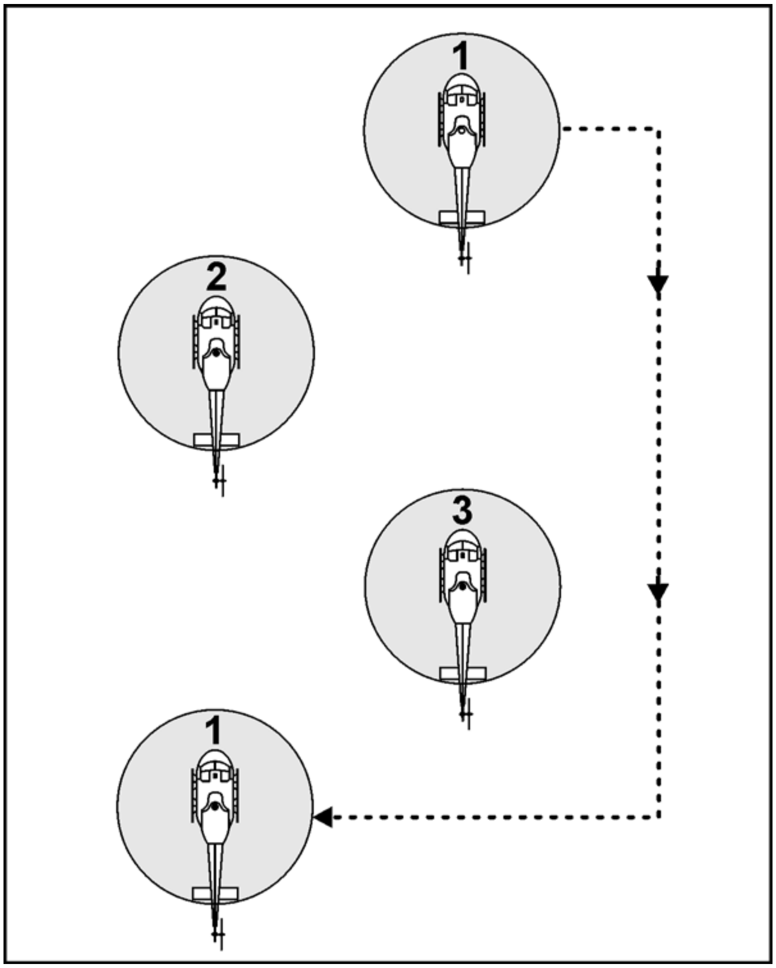
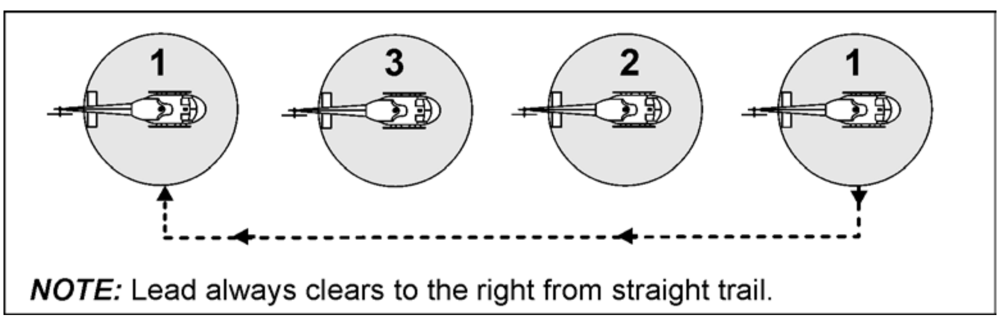


Figure 3.7. Lead Change From a Straight-Trail Formation.



3.82.2.1. Only the lead aircraft can direct formation lead changes. Lead changes and formation changes will not be accomplished simultaneously. However, a staggered formation will switch sides when Number 2 becomes lead without any repositioning of aircraft (Figure 3.6). The new lead may change formations after the lead change is completed.

3.82.2.2. When lead has received acknowledgment of a lead change from all aircraft, he or she will initiate the lead change. The new lead aircraft will assume lead duties, but the flight lead designated on the flight authorization will retain command of the flight.

3.82.2.3. For staggered formations, lead will maneuver clear of the formation and then reenter the formation as briefed. Lead will use scanners to stay clear of the flight. Variations of lead change procedures will be briefed as applicable.

3.82.2.4. When radios are used, lead will direct the lead change by stating flight call sign, aircraft number in flight, and assume lead (for example, "Blue 05 Flight, 2 assume lead"). The aircraft assuming lead will state "abeam" when approaching abeam the leader and ready to assume formation lead. When ready to relinquish formation lead, lead will state "tally ho." The new lead will state "assuming lead," and all aircraft will establish proper configuration (transponder, lights, radios, etc.).

3.82.2.5. The original formation call sign will be maintained regardless of the number of lead changes.

3.83. IMC Avoidance. Avoid IMC to the maximum extent possible. This will greatly reduce the chance of entering a situation that would require the use of lost visual contact procedures and a climb to MSA. When deteriorating weather conditions are encountered en route, consider the following options: (1) alter the course to circumnavigate the weather, (2) reverse course to remain in VMC, (3) send a "weather ship" ahead of the formation, or (4) make a formation landing. These options encourage formation integrity until an alternate plan of action can be determined. Every formation briefing will include IMC avoidance considerations and lost visual contact procedures.

3.84. Types of Lost Visual Contact. Two types of lost visual contact can occur, as follows:

3.84.1. VMC "No Joy." In this situation, a wingman loses sight of the preceding aircraft because of terrain or excessive distance, yet maintains VMC. The wingman losing sight of the preceding aircraft will call the call sign, position, and no joy (for example, "Blue 68 flight, 3 is no joy"). The preceding aircraft in the formation will turn his or her anticollision light on or initiate prebriefed procedures for the "no joy" aircraft to affect a rejoin. (Depending on tactical situation, alternate procedures may include climbing, describing the location, proceeding to the rejoin point, etc.) When the "no joy" aircraft is in position to resume formation flight, he or she will call the call sign, position, and in (for example, "Blue 90 flight, 3's in"). The preceding aircraft will then extinguish its strobe, if required.

3.84.2. Inadvertent IMC "Blind Alley":

3.84.2.1. The other type of lost visual contact is when a flight member goes inadvertent IMC and loses sight of the preceding aircraft or the ground. All members of the formation must react quickly and precisely to prevent a midair collision. In such a case, the aircraft losing contact will call the call sign, position, and "blind alley." Lead will immediately initiate the breakup by announcing "execute," the type of breakup (mountainous or nonmountainous) unless prebriefed, the base magnetic heading (MAG), the airspeed he or she will maintain, and the MSA for that route segment.

3.84.2.2. At lead's command of "execute," all wingmen will take action based on the announced heading, airspeed, and MSA. They will acknowledge lead's call and turn their lights and transponders on. Once the formation executes the lost visual procedure, lead will announce or prebrief any changes to MAG headings, airspeed, and MSA. These items may change for several reasons, to include (1) formation continues on course, (2) formation aborts mission, and/or (3) MSA changes for next leg of route.

3.84.2.3. If another aircraft calls "blind alley" and you still have sight of the preceding aircraft and can maintain VMC, maintain formation position on that aircraft. If you then lose sight of the preceding aircraft, execute lost visual contact procedures for your original position in the formation.

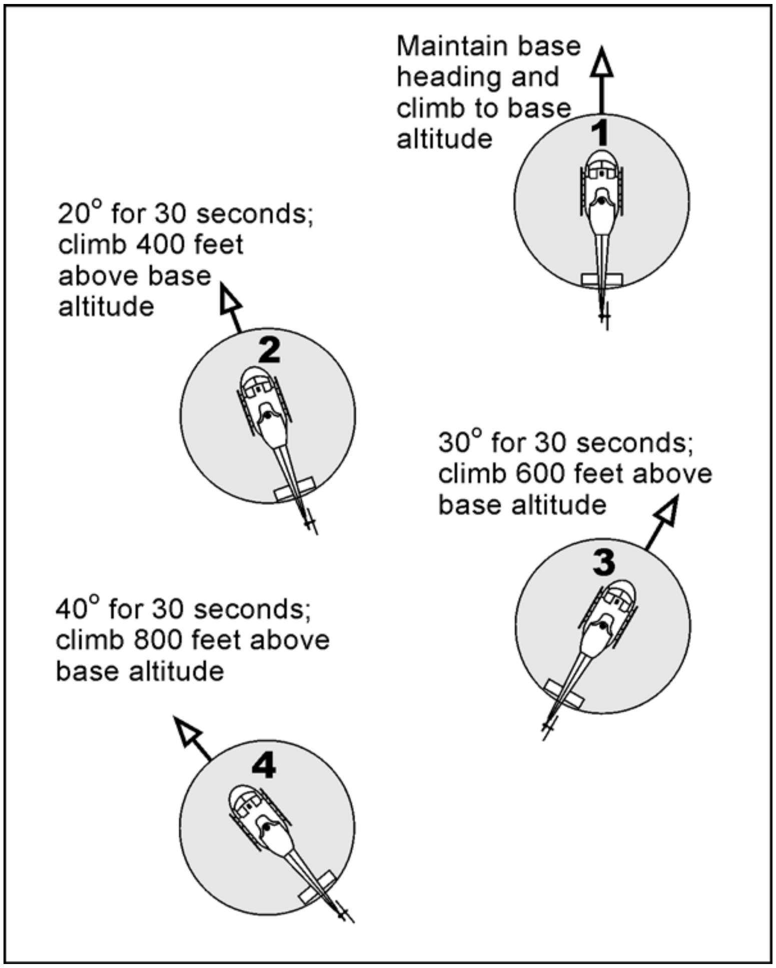
3.84.2.4. If a wingman calls "blind alley" and lead is still VMC and able to ensure terrain or obstacle clearance, lead should stay in VMC. Lead must still make base heading (MAG), airspeed, and MSA calls for the wingmen executing the lost visual contact procedures.

3.84.2.5. If confronted with a large formation requirement where lost visual contact (inadvertent IMC) is possible, give strong consideration to canceling the mission or rerouting the formation. In these conditions, the maximum number of aircraft should be limited to five per element.

3.85. Lost Visual Contact Procedures for Nonmountainous Terrain:

3.85.1. Lead will maintain base heading (usually straight-ahead) and airspeed (which may require an acceleration for large formations) and climb to MSA (Figure 3.8).

Figure 3.8. Lost Visual Contact—Nonmountainous Terrain.



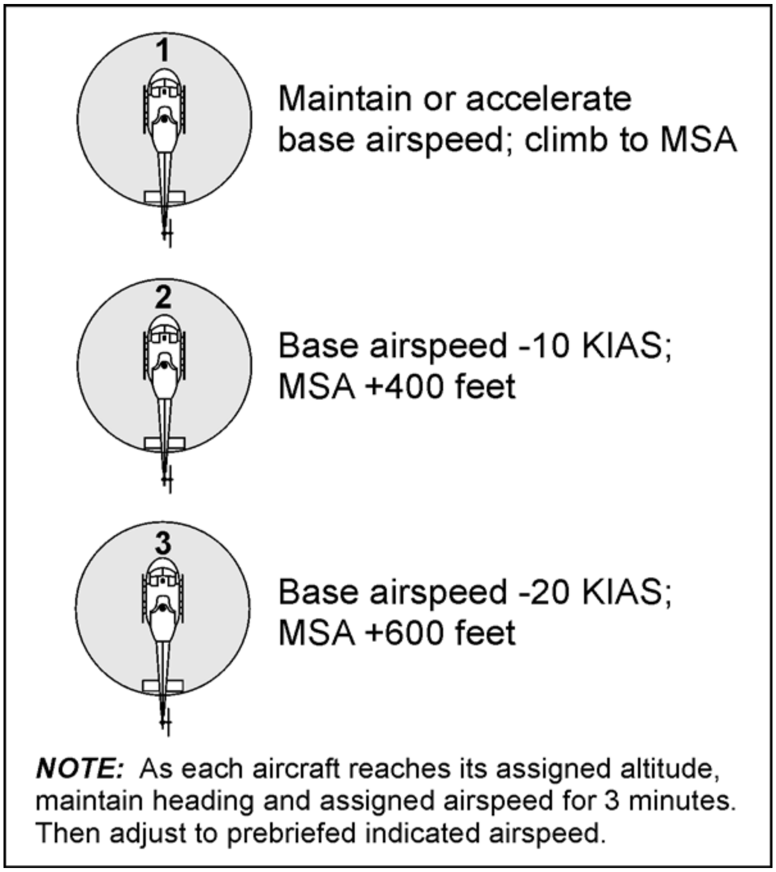
3.85.2. Wingmen will turn away from the preceding aircraft and climb according to the following: heading offset = position x 10 degrees; altitude above MSA = position x 200 feet. Timing for all wingmen is 30 seconds and starts when they each reach their altitude. At the end of the timing, they will return to the base heading (MAG).

3.85.3. The rate of climb will be prebriefed. ***NOTE:*** If directly behind preceding aircraft, the wingman will turn right to leave the formation.

3.86. Lost Visual Contact Procedures for Mountainous Terrain:

3.86.1. Lead will fly at a predetermined base airspeed (Figure 3.9). If possible, the base airspeed should be high enough to allow the formation more maneuvering room and avoid excessively slow airspeeds for wingmen. For example, assuming 100 KIAS as the cruise airspeed, lead should maintain base heading (MAG), accelerate to 110 KIAS base airspeed, and climb to MSA if IMC is encountered.

Figure 3.9. Lost Visual Contact—Mountainous Terrain.



3.86.2. Wingmen will climb by multiplying their position by 200 feet for their altitude above MSA. Wingmen will adjust to maintain airspeed 10 knots less the aircraft ahead of them. For example, Number 3 will adjust to maintain base airspeed -20 knots and climb 600 feet above MSA.

3.86.3. As each aircraft reaches its assigned altitude, it will maintain heading and assigned airspeed for 3 minutes and then adjust to the prebriefed indicated airspeed.

3.86.4. The rate of climb will be prebriefed.

3.87. Rejoin After Breakup:

3.87.1. Lead will make an assessment of the weather situation, aircraft navigation capability, etc., and decide whether to abort or continue the mission.

3.87.2. After completing a breakup, the crew will contact ATC facilities for an IFR approach to an appropriate facility.

3.88. Leaving Formation. Aircraft normally will leave the formation by maneuvering away from the formation until clear. Aircrews will notify lead when departing the formation and will not rejoin until permission is received from lead.

3.89. Terminal Operations:

3.89.1. Procedures for formation approaches and landings must be planned and briefed in detail. However, this does not prohibit common sense deviations from preplanned procedures if an unexpected situation is encountered. ***NOTE:*** Special consideration should be made for potential brownout or whiteout conditions and procedures for the flight and individual aircraft to follow.

3.89.2. Wingmen will not fixate on lead or the preceding helicopter during the approach. While maintaining formation position, they will identify and land to either preplanned points (such as lights) or select a landing point in relation to lead and/or the preceding helicopter. They will rely on periodic cross-checks and scanners to maintain position during the approach. ***NOTE:*** Wingmen must remain in a position that allows the preceding aircraft maneuvering space because significant maneuvering may have to occur in close proximity to the LZ to accomplish the landing.

3.89.3. When feasible, shallow approaches are best for marginal power situations because power changes and flare attitudes will be minimized and all aircraft will arrive IGE at about the same time. Shallow approaches may minimize brownouts in dusty conditions.

3.89.4. Wingmen may stack level to slightly high in order to enter ground effect at about the same time as lead. These factors will help wingmen make a simultaneous landing. Stacking low will subject the helicopter to intense rotor wash. Stacking high may result in an OGE hover. Both situations will result in significantly higher power requirements.

3.89.5. Go-around procedures must be preplanned and briefed in detail. Go-arounds may be executed as a flight or individually. If lead calls "flight go-around," the flight will maintain formation integrity and execute the go-around. Wingmen may call "go-around" if a hazard to the flight is observed.

3.89.6. If flight lead needs to go around but determines it is safe to allow the wingmen to continue the approach, lead will call "lead is go-around." Individual pilots, when determining they cannot safely execute the preplanned approach and landing, may decide to execute an individual go-around. This decision will be announced on the appropriate radio (for example, "2 is going around, left side"), accompanied by a change in lighting configuration to ensure visual recognition by the remainder of the flight.

3.89.7. If another landing attempt is to be made, the choice of landing location will be made with the following priority: (1) the original preplanned landing point, (2) a preplanned alternate landing point, or (3) an unplanned landing point. If the pilot decides to land to an unplanned landing point, the decision will be announced on a radio. If a pilot executes an individual go-around and original position in the formation must be regained, the go-around may be accomplished (1) by executing a prebriefed option of repositioning on the ground at the landing area prior to takeoff, (2) by a takeoff in the original sequence regardless of landing point, or (3) by repositioning in the air after takeoff.

3.89.8. When determining the type of approach to be flown, lead will consider the capabilities of the wingmen (gross weight, power requirements, etc.) and the condition of the landing area (obstacles, surface, etc.).

3.90. Landing. During staggered formation recoveries, wingmen will maintain a 1 to 3 RD separation throughout the approach and landing. Increased separation may be prebriefed. Lead may direct different landing configurations depending on mission requirements, LZ layout, and surface condition (for example, 500-foot spacing or individual recoveries).

WARNING

Avoid excessive maneuvering on final when flying large formations. Always maintain formation separation on the preceding aircraft while considering the effects your maneuvering may have on subsequent aircraft in the formation.

Section 3H—Low-Level Operations

3.91. General. Flight below 500 feet AGL is considered low-level flying and is the subject of this section. Low-level flight entails greater risk than normal flight, and, therefore, requires additional restrictions. During the en route phase, flight will be at or above 100 feet AHO.

3.92. Low-Level Flight Areas. Low-level flight must be conducted in a designated low-level flight areas (for example, areas of operation [AO] Bearcat, Hawk, and Vanguard). The area or route will have defined boundaries and meet the following requirements prior to any low-level flight:

3.92.1. An extensive map study of the selected routes and areas will be completed. All manmade obstacles higher than the lowest altitude to be flown within the area on the flight map will be annotated.

3.92.2. Aircraft transitioning across active nap of the earth (NOE) boxes or NOE routes will maintain 200 feet AHO or higher. NOE routes are annotated in USAAVNC Reg 95-2, Chapter 6, and posted on the master map in Lowe Base Operations.

3.93. Maps:

3.93.1. Maintain a master map depicting the low-level flight areas or routes for flight planning purposes. Annotate all manmade obstacles over 50 feet AGL, except when below the tree line. Also annotate published low-level routes, NOE boxes, no-fly areas, and other hazards within the boundaries.

3.93.2. Update the master map monthly, using CHUM data and map updates received from the 1/212 AVN and 1/223 AVN. Annotate the date of the CHUM update on the master map. Continuously scan for uncharted obstacles. When they are found, temporarily suspend training and record appropriate information (location and approximate height AGL). Upon landing, ensure this information is immediately passed to the unit safety officer.

3.93.3. Maps used for flying will reflect the same information as the master map. Crewmembers will ensure the map is updated and annotated, using the latest CHUM. Aircraft commanders will ensure current operations has a copy of the planned low-level flight route.

3.94. Map Selection:

3.94.1. Select maps providing the detail desired to satisfy navigation requirements. Maps with a scale of 1:250,000 or greater detail are desired for low-level operations. Use a large-scale map for navigation to the objective area and, if possible, transfer to a detailed map (1:50,000 or greater) to locate the objective. Use recent aerial reconnaissance photographs of the objective area, if available. Exercise caution when transferring from one scale map to another. Make the transition between maps at a prominent terrain feature that is readily identifiable on both maps.

3.94.2. The tactical pilotage chart (TPC), scale 1:500,000, and the JOG, scale 1:250,000, depict terrain contours every 500 feet and 100 feet, respectively, at higher elevations. TPCs and JOGs could have an inherent error in depicting terrain elevation of up to 499 feet and 99 feet respectively. In addition, obstructions below 200 feet are not charted or required to be lit at night. Therefore, it is possible to have an obstacle as high as 698 feet on a TPC and 298 feet on a JOG that is not depicted. Remember the VFR principle of "see and avoid" applies to the ground and obstacles as well as to other aircraft.

3.95. Navigation. Thorough flight planning is the key to successful tactical and low-level operations. Pilots should arrive at their planned objective point within ±2 minutes of the flight plan arrival time. There are two types of navigating and flying in the low-level environment—low-level navigation and contour navigation. (A combination of both is normally used in a tactical environment.) These basic methods are described below:

3.95.1. Low-Level Navigation:

3.95.1.1. Low-level navigation is used when flight operations permit the use of specific headings and a constant indicated altitude and groundspeed. This method of navigation lessens the possibility of enemy detection or observation in a relatively permissive environment and can be used over flat, open terrain where significant terrain features are not available for navigation reference.

3.95.1.2. Low-level navigation will be used when flying over friendly territory or to comply with low-level corridor procedures to or from forward operating locations. Low-level navigation is less demanding than contour navigation because it permits the use of standard dead-reckoning techniques.

3.95.2. Contour Navigation. During contour navigation, the pilot preplans a route based on charted terrain features leading toward the objective. Groundspeed, obstacle clearance altitude, and heading may vary considerably based on the terrain, weather, visibility, and anticipated threat. Indicated altitude will vary considerably because the pilot will maintain a relatively constant obstacle clearance altitude in order to take advantage of the available contours.

3.96. Route Selection. Select routes that will avoid enemy threats and, if possible, provide safe areas for a precautionary landing. As a minimum, select routes as follows:

3.96.1. Avoid known hostile locations. Use available terrain features for masking and navigation purposes.

3.96.2. Avoid a direct routing to the objective. Plan sufficient course changes to avoid disclosing the objective. If possible, do not use the same routing for ingress and egress. Ensure low-level navigation training routes are at least 20 minutes long with a minimum of three turn points.

3.96.3. Normally, do not exceed 20 nm between checkpoints for dead reckoning. The type of terrain will dictate the selection and distances between checkpoints.

3.96.4. Establish an IP over a prominent feature that is easily identifiable from low altitudes. The IP is a point near LZs over which final course alterations are made to arrive at the specified objective. The distance from the IP to the objective will vary with the situation, but should be approximately 3 to 12 nm from the objective. Attempt to select an IP that can be overflown on the inbound heading, minimizing turns from the last leg flown (30 degrees or less).

3.96.5. Review and deconflict low altitude charts for IFR, VFR, and slow-speed, low-altitude training routes and annotate potential conflict areas along the proposed routes during premission planning. ***NOTE:*** Following roads or wires to an LZ is prohibited.

3.97. Map Preparation:

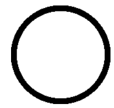
3.97.1. Carefully review maps to identify obstacles and hazardous terrain. Annotate hostile threats and turning points or checkpoints on the map. Establish specific course lines between turning points for low-level navigation. When terrain-masking, these lines do not necessarily represent the ground track to be flown. Time tick marks based on an established groundspeed are optional. These marks may be established for each leg or be cumulative for the entire route.

3.97.2. Other flight planning data and information may be annotated, but caution must be used to avoid obscuring pertinent information. Aircraft commanders are allowed to modify the symbols used based on the actual mission profile, threats, terrain, political considerations, etc.

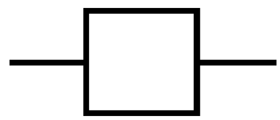
3.97.3. Pilots must compute a minimum safe altitude for each leg of the low-level route. For flights conducted in a designated low-level area, one minimum safe altitude may be computed for the planned area of operation. The heading and altitude must provide a minimum of 1,000 feet clearance (2,000 feet in mountainous areas) above obstacles within 5 nm. This altitude will be used in the event of inadvertent IMC. Mountainous areas are defined as areas where a 500-foot elevation change occurs within 1/2 nm of the flightpath.

3.98. Standard Symbols for Map Preparation. The following standard annotations and symbols should be used in preparing maps for all navigation operations. Other symbols may be used in addition to those listed. Use markers, tape symbols, or other devices that will not smudge or be inadvertently erased. Use a plotter for annotating standard symbols.

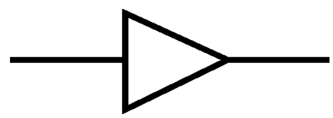
3.98.1. Way Point. Use a circle to depict en route points where the aircraft course is altered or key actions occur. Label way points consecutively to facilitate identification. Place corresponding navigation information blocks (NIB), if used, immediately adjacent to the course line.



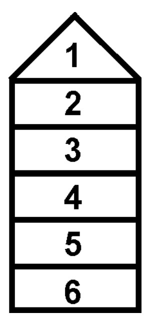
3.98.2. Initial Point (IP). The IP is identified by a square centered on the point.



3.98.3. Objective Point. The objective point is identified by a triangle centered on the planned point with the apex pointing in the direction of flight.

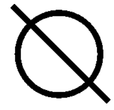


3.98.4. Navigation Information Blocks (NIB). NIBs are designed to give the crew the required navigational data from the present way point to the next way point. ***NOTE:*** If an AF Form 70, **Pilot's Flight Plan and Flight Log,** is used, the NIB is not required.



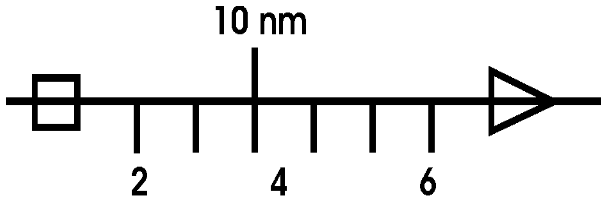
LEGEND:
1. To way point—the designator of the next way point.
2. MAG heading—the magnetic heading to the next way point.
3. Distance—enter the distance to the next way point or leg distance.
4. ETE—the time to the next way point (estimated time en route).
5. Fuel—fuel required to complete the planned flight and reserve.
6. MSA—minimum safe altitude for each leg.

3.98.5. Emergency Landing Bases (Optional). Use a single circle with a diagonal line to identify those airfields that may be used in an en route emergency.



3.98.6. Recovery Arrow Box (Optional). Use a horizontally divided arrow box pointing in the general direction of the alternate recovery base to provide navigational information to the alternate base. This box depicts base name, distance in nms, and magnetic course from divert point to alternate base.

3.98.7. Course Line and Time or Distance Marks. Draw course lines for the entire route inbound to the objective and continue on to portray the return route.



NOTE: When used, time marks should be placed on the right side of the course line; distance marks should be placed on the left side of the course line.

3.98.8. Operational Advisory Annotations. Advisory annotations concerning operational aspects of the mission are positioned to the side of the course line. The annotations consist of a line at the point en route where the function should be performed, and the action is noted on the side end of the line. At the discretion of the mission planner, the action description may be either enclosed in a box or left open. Examples of these operational advisories are as follows: start climb, start descent, IFF/SIF standby, lights off, lights on, TACAN receive only, IFF/SIF on, TACAN T/R.

3.99. Us of AF Form 70. Prepare an AF Form 70 or a more detailed navigation log for each mission and include the following as a minimum: turning points, headings, distances, ETEs, MSAs, and fuel computations.

3.100. Power Check. Prior to low-level operations, perform a power available check IAW paragraph 3.43. Prior to descending on a low-level route, perform a power available check. OGE power or better must be available for all low-level operations.

3.101. Crew Coordination. Crew coordination is a critical factor during low-level operations. Limit crew conversation to accomplishment of essential tasks. Each crewmember will call out hazardous obstacles and assist navigation by identifying prominent features along the route.

WARNING

Three to four seconds are needed from the time a stimulus (perceived closure rate, crewmember input, etc.) is received and recognized until the reaction (control input, crewmember action, etc.) to the stimulus is complete. All crewmembers must be cognizant of this relationship, especially during critical phases of flight.

3.102. PF Responsibilities. The PF will:

3.102.1. Plan enough room for cruise airspeed maneuvering.

3.102.2. Be aware of wind direction and velocity.

3.102.3. Avoid steep angles of bank. At approximately 45 degrees, the tip path plane will be below the landing gear.

3.102.4. Do not attempt to clear terrain and obstacles by cyclic inputs alone. Climbs and descents are best accomplished by coordinated cyclic and collective inputs. Be aware of abrupt aft cyclic inputs while low level because they may result in tail rotor contact with surface obstructions.

3.102.5. Anticipate power requirements when approaching a ridgeline. If feasible, increase power early and accelerate so, when the climb is initiated, there will be sufficient airspeed to assist in clearing the terrain. Approach ridgelines at approximately 45 degrees. This provides an escape route if power is insufficient to climb over the ridge or an unexpected threat is encountered on the other side.

3.102.6. Give special consideration to preplanning immediate actions in the event of engine failure while low level. Have an emergency landing site in mind whenever possible.

3.103. PNF Responsibilities:

3.103.1. Monitor the aircraft position on the map at all times.

3.103.2. Keep the crew informed of ETAs, descriptions of turning points, and intermediate checkpoints.

3.103.3. Announce the direction of turn for the next leg prior to the turning point. When reaching a turning point, give the pilot a turn and tell him when to stop.

3.103.4. Compare actual time and fuel against planning data at each checkpoint.

3.103.5. Monitor and update cockpit instrument and NAVAIDs and make radio changes.

3.104. Unknown Position. If a checkpoint cannot be identified, continue on course. (As a guide, use leg time plus 10 percent.) Then turn to the next course. Continue the route without establishing the exact position only if prominent terrain features can be readily identified and the area of planned overflight is relatively secure. Although climbing may assist in determining position by increasing the field of vision, you will be more susceptible to enemy detection. If a climb is initiated, concentrate on reorientation so a descent can be made as soon as possible. If a position cannot be established, abort the mission. During training, if you cannot establish your position, climb to a safe altitude and reorient yourself before resuming low-level navigation.

3.105. Safety. Flight below 100 feet has risks that can be minimized by reducing airspeed (groundspeed) and limiting aircraft attitude changes (maneuvering). Proper mission planning should result in a "near straight-in approach" from the en route phase. Airspeed must be reduced to remain in a see-and-avoid envelope for the increasing proximity to the ground and hazards. Pitch changes (angle of bank and tail-low attitudes) must be minimized. Staying within the aircraft's height-velocity envelope, flying into the prevailing wind, and avoiding settling with power profiles are major considerations. Flight safety must never be needlessly compromised for threat avoidance.

3.106. Low-Level Flight and Approaches:

3.106.1. Power Reserve. A major factor affecting low-altitude flight is power reserve, especially in mountainous terrain. Prior to any steep turns (45 degrees or more) when power available is critical, ensure airspeed is adequate to trade for necessary G loading to maintain level flight. To prevent ground impact during a steep turn, immediately decrease the angle of bank and then increase G loading.

3.106.2. Low-Level Approach:

3.106.2.1. This approach is used during missions requiring low altitudes for ingress to the objective. These approaches are more fluid than approaches initiated from higher altitudes; and they may involve changes of approach angle, airspeed, and rate of descent dependent on terrain and obstacle clearance requirements. Precise crew coordination is necessary to ensure the crew is able to clear the approach path for the pilot.

3.106.2.2. Low-level approaches may be initiated at high or low speed and may be straight-ahead or turning. Initiate the low-level approach only after the landing area is identified. Adjust the controls as necessary to simultaneously decelerate, position the aircraft on the desired landing direction, and intercept the desired approach angle. Arrive on short final on the desired approach angle with a normal descent rate and a normal rate of closure for the final approach angle flown. The approach may be to a hover or touchdown, but must terminate at or near zero groundspeed.

WARNING

Exercise extreme caution during the deceleration phase and/or turn to ensure tail rotor or main rotor clearance from obstacles.

WARNING

Avoid excessively high rates of descent especially while in a turn and/or at low airspeeds.

3.107. Form Prescribed. AETC Form 15.

3.108. Forms Adopted. DD Forms 175, 175-1, and 365-4; DA Forms 2408-13, 4186; and 7243-R; AF Forms 8, 70, 457, 651, 847, 1042, and 4031; and AETC Form 1138.

WILLIAM M. FRASER III, Brigadier General, USAF
Director of Operations

Attachment 1

GLOSSARY OF REFERENCES AND SUPPORTING INFORMATION

References

AFI 11-202, Volume 1, *Aircrew Training*
AFI 11-202, Volume 2*, Aircrew Standardization/Evaluation Program*
AFI 11-202, Volume 3, *General Flight Rules*
AFI 11-205, *Aircraft Cockpit and Formation Flight Sig*nals
AFI 11-218, *Aircraft Operation and Movement on the Ground*
AFI 11-290, *Cockpit/Crew Resource Management Training Program*
AFI 11-301, *Aircrew Life Support (ALS) Program*
AFI 11-401, *Flight Management*
AFI 11-402, *Aviation and Parachutist Service, Aeronautical Ratings and Badges*
AFI 11-403, *Aerospace Physiological Training Program*
AFI 13-207, *Preventing and Resisting Aircraft Piracy (Hijacking)*
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AFI 36-2201, *Developing, Managing, and Conducting Training*
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TC 1-211**,** *Aircrew Training Manual─Utility Helicopter UH-1*
TM 55-1520-210-10, *Operator's Manual, Army Model UH-1H/V Helicopters*
TO 12S10-2AVS9-2, *Maintenance Manual─Intermediate with Illustrated Parts Breakdown, Image Intensifier Set, Night Vision, Type AN/AVS-9(V)*
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Abbreviations and Acronyms

AGL—above ground level
AHO—above highest obstacle
AO—area of operations
ATC—air traffic control
ATB—aviation training brigade (Army)
AVN—aviation battalion
CHUM—Chart Updating Manual
CRM—cockpit/crew resource management
DOIM—directorate of information management
EMI—equivalent moon illumination
EP—emergency procedure
EPE—emergency procedures evaluation
ETA—estimated time of arrival
ETE—estimated time en route
ETL—effective translational lift
FCIF—flight crew information file
FE—flight examiner

FEF—flight evaluation folder
fpm—feet per minute
FTS—flying training squadron
HARM—host aviation resource management
IAW—in accordance with
ID—identification
IFF—identification friend or foe
IFG—in-flight guide
IFR—instrument flight rules
IGE—in ground effect
IMC—instrument meteorological conditions
IP—instructor pilot, initial point
IQT—initial qualification training
ITO—instrument takeoff
JOG—joint operations graphic
KIAS—knots indicated airspeed
LZ—landing zone
MAG—magnetic
MAJCOM—major command
MDA—minimum descent altitude
MDS—mission design series
MOA—memorandum of agreement
MOI—Method of Instruction
MQF—master question file
MQT—mission qualification training
MSA—minimum safe altitude
MSN—mission
NA—not applicable
NAVAID—navigational aid
NIB—navigation information block
nm—nautical mile
NOE—nap of the earth
NOTAM—notice to airman
Nr—rotor speed (in rpm)
NVG—night vision goggles
OAT—outside air temperature
OGE—out of ground effect
OG/OGV—operations group stan/eval
OSS—operations support squadron
PA—pressure altitude
PCS—permanent change of station
PF—pilot flying
PIT—pilot instructor training
PNF—pilot not flying
PPC—performance planning card
psi—pounds per square inch
RD—rotor disk
rpm—revolutions per minute
RWQC—Rotary Wing Qualification Course

SEF—simulated engine failure
SIF—selective identification feature
sm—statute mile
stan/eval—standardization/evaluation
SUPT-H—specialized undergraduate pilot training - helicopter
TACAN—tactical air navigation
TC—training circular
TM—technical manual
TO—technical order
TOLD—takeoff and landing data
USAAVNC—United States Army Aviation Center
VFR—visual flight rules
VMC—visual meteorological conditions
VOR—very high frequency omnidirectional range station

Terms

Abort—To terminate a specific maneuver or to turn back from or cut short a mission before its successful completion for reasons other than enemy action. This may occur after an aircraft is airborne or on the ground before takeoff.
Bingo fuel—The minimum computed fuel required at a point in flight that will allow a safe return to a refueling point (with required reserve fuel).
"Blind alley"—Standard terminology for inadvertent IMC.
Chatter mark—Code words used during covert radio transmissions.
Caution—An operating procedure, technique, or information that may result in damage to equipment if not carefully followed.
Certification—The process of certifying an individual to perform a specific event not requiring an evaluation.
Divert—An operational term for the in-flight change to a mission's intended point of landing or mission location.
Eligibility period—The 6-month period prior to the expiration date of an evaluation.
Emergency procedures evaluation (EPE)—A verbal evaluation used to evaluate emergency procedures and systems knowledge.
Effective translational lift (ETL)—The point where the main and tail rotor systems fly into undisturbed air and become more efficient, approximately 20 knots for the H-1.
Evaluation profile—The required items of an evaluation to include a scenario.
Initial evaluation—The first evaluation of any type for a crew position in an MDS, for example, INIT QUAL, INIT MSN (Rem), INIT MSN (NVG), INIT MSN (Tac), INIT MSN (Nt LL).
Initial point (IP)—A point near LZ over which final course alterations are made to arrive at the specified objective.
Intermittent or temporary weather conditions—The definition of these two terms is synonymous for aircrew use. The terms describe the weather (cloud coverage and height, visibility, and winds, including gusts) expected to exist for short periods of 30 minutes or less and forecast to occur less than one-half of the forecast period.
Join-Up—The procedure for two or more aircraft to join a formation.
"Knock-it-off"—A call by anyone in the crew or formation to discontinue maneuvering. Usually called when an unsafe situation is developing.
Mission capable fuel—The minimum fuel required to complete the mission, as planned, and to land at the destination with the required fuel reserves. Also called mission continuation fuel at en route way points.

MSN evaluation—Qualifies an individual to perform an operational mission.
"No joy"—Standard terminology for lost visual contact of preceding aircraft while VMC.
Objective point—A drop zone, LZ, or extraction zone or point at which a low-level route terminates.
Rejoin—The procedure for two or more aircraft in a formation to close the separation distance after a breakout.
Rotor disk (RD)—A measure of separation within a helicopter formation based on the largest rotor size of any aircraft within the formation.
Warning—An operating procedure, technique, or information that may result in death or injury if not carefully followed.

Attachment 2

UH-1H FLIGHT EVALUATION CRITERIA

A2.1. Ground Phase Requisites. Ground phase requisites are graded as level 1, 2, or 3 IAW AFI 11-202, Volume 2. See Figure A2.1 for the publications check and Figure A2.2 for the EPE.

Figure A2.1. Publications Check.

1 Publications current and properly posted.

2 Publications current with minor or administrative errors in posting

3 Publications not current and/or with errors in posting that result in incorrect or incomplete information.

Figure A2.2. Emergency Procedures Evaluation (EPE).

1 Given a simulated emergency, correctly analyzed the situation and provided the appropriate action. (Boldface, if required, was provided promptly with correct response in the correct sequence.) Used the checklist or flight manual, as required. Demonstrated a thorough understanding of aircraft systems, limitations, and performance characteristics.

2 Minor deviations from 1 criteria. Did not compromise safety, aircraft limitations, or maneuver or mission effectiveness. Analysis was slow or incomplete. Had some deficiencies in systems knowledge. Referred to the checklist or flight manual, as required.

3 Major deviations from 1 criteria. Made incorrect analysis or incorrect response to boldface. If required, boldface was provided with significant hesitation or with incorrect response or sequence. Had significant deficiencies in systems knowledge. Did not refer to the checklist or flight manual, as required.

A2.2. Flying Phase Areas, Subareas, and Criteria (AETC Form 15). See Figure A2.3 for flying phase areas, subareas, and criteria. ***NOTE:*** Asterisk (*) items identify critical subareas. Q- and U are defined in Chapter 5 of AFI 11-202, Volume 2. Therefore, if there are no specific additions to these basic definition criteria, Q- and U are not listed in Figure A2.3.

Figure A2.3. Flying Phase Areas, Subareas, and Criteria.

I. GENERAL:

1. Knowledge of Publications, Systems, and Limits:

Q Demonstrated a thorough knowledge of National Airspace System rules and procedures, applicable aircraft, equipment, publications, and systems operating limits. Ensured satisfactory operation within limits.

2. Performance Data and Weight and Balance:

Q Checked all factors applicable to the flight. Verified accuracy of performance data and weight and balance information to ensure operation within specified parameters. Correctly computed TOLD and/or weight and balance IAW the flight manual and student guide. Determined the fuel required ±50 pounds and endurance ±10 minutes (based on the expected fuel at takeoff) and the average cruise airspeed planned. Computed the TOLD within the following specified tolerances: weight ±100 pounds, center of gravity ± 0.1 inches, power available ±1 psi, power required ±2 psi, and Vne ±2 knots.

Q- Made minor errors or omissions in the above criteria. Computations were within the following specified tolerances: weight ±200 pounds, center of gravity ± 0.2 inches, power available ±2 psi, power required ±3 psi, and Vne ±3 knots.

3. Preflight and Postflight:

Q Accomplished required aircraft or equipment inspections IAW TM 55-1520-210-10 (flight manual) and applicable directives. Ensured the aircraft was correctly configured for assigned mission and was fully aware of aircraft readiness for flight. Appropriate checklists and/or TOs were out and available for reference. Ensured all required personal and mission equipment was available. Equipment was properly preflighted, operated, and secured. Had a thorough understanding of the information contained in aircraft and equipment forms and correctly determined aircraft or equipment status. Completed all required forms (before, during, and after flight, to include training folders, as applicable) without significant errors.

4. Cargo and Passenger Loading, Offloading, and Tiedown:

Q Satisfactorily loaded or offloaded the aircraft and secured all cargo and equipment IAW TM 55-1520-210-10 (flight manual) and other applicable directives.

5. Startup and Shutdown Procedures:

Q Accomplished startup and shutdown procedures, including all required checks IAW TM 55-1520-210-10 (flight manual), checklist, and applicable directives. Correctly configured the cockpit and coordinated with ground support personnel. Was familiar with required responses to abnormal or emergency situations.

6. Use of Checklists:

Q Effectively referenced and completed appropriate checklists with accurate and timely responses. Was familiar with checklist and contents. Demonstrated a thorough knowledge of checklist notes, cautions, and warnings without reference to flight manual. Before-takeoff and/or before-landing checklists adequately covered aircrew intentions in the event of an abort, aircraft problem, etc. Without prompting from the IP or evaluator, initiated the leveloff, after-landing, before-takeoff, before-takeoff (multiple takeoffs), before-landing, and hot-refueling checklists, as appropriate, in flight.

Q- Was slow to respond and/or had difficulty executing proper procedures and had poor checklist discipline. Before-takeoff and/or before-landing checklists did not adequately cover aircrew intentions in the event of an abort, aircraft problem, etc.

U Did not use or complete checklists. Lacked acceptable familiarity with contents. Never initiated or completed fuel consumption check.

***7. Safety:**

Q Recognized factors affecting safety of flight. Assessed available options and selected a suitable course of action based on reasonable risk assessment. Was aware of and complied with all safety factors required for safe aircraft operation and mission accomplishment.

U Was not aware of or did not comply with all safety factors required for safe operation of aircraft or mission accomplishment. Did not adequately clear. Operated aircraft in a dangerous manner. Unnecessarily subjected crew or aircraft to increased risk. Compromised safety and allowed a dangerous situation to develop.

***8. Judgment:**

Q Assessed all aspects of the situation and took an appropriate course of action consistent with prudence, common sense, integrity, mission priority, and safe and effective mission accomplishment.

U An untimely or inappropriate decision led to an inappropriate response to the situation, compromised integrity or safety, and/or degraded effective mission accomplishment.

9. Cockpit/Crew Resource Management (CRM):

a. Situational Awareness:

Q Was aware of and responded to all factors that affected safety, crewmembers, aircraft, or mission effectiveness. Maintained continuous perception of self and aircraft in relation to the dynamic environment of flight, threats, and mission. Demonstrated the ability to forecast and then execute tasks based on that perception. Demonstrated knowledge and skills to prevent the loss of situational awareness, recognized the loss of situational awareness, and when necessary, demonstrated techniques for recovering from the loss of situational awareness.

b. Crew Coordination and Flight Integrity:

Q Communicated and coordinated effectively with other crewmembers without misunderstanding, confusion, or delay. Considered the needs, responsibilities, abilities, and inputs of all crewmembers. Worked effectively with all members of the crew to accomplish the tasks of the mission. Utilized all the members of the flying package to accomplish the mission at hand. Had knowledge of and effectively exercised the attributes of leadership, responsibility, assertiveness, conflict resolution, hazardous attitudes, behavioral styles, legitimate avenues of dissent, and team building.

c. Communications/ATC Procedures:

Q Was fully knowledgeable of communications procedures. Required contacts were made without hesitation, omission, or discrepancy. Promptly complied with all controlling agency’s instructions and made required reports. When communicating with ATC facilities, used correct radio communication procedures and phraseology per the Airman’s Information Manual (AIM) and DoD Flight Information Publication (FLIP). Acknowledged each radio communication with ATC by using the correct call sign. Obtained proper clearance from the controlling agency. Shared information with others to cause some kind of action—direct, inform, question, or persuade. Had knowledge of common errors, cultural influences, and barriers (grade, age, experience, and position). Demonstrated effective listening, feedback, precision, and efficiency of communication with all members and agencies (crewmembers, wingmen, weather, ATC, intelligence, etc.).

Q- Was slow to comply with controlling agency instructions or unsure of reporting requirements. Did not compromise safety, aircraft limitations, or maneuver or mission effectiveness.

U Was unfamiliar with proper communications procedures. Required contacts were delayed, misleading, or incorrect. Failed to comply with controlling agency instructions and/or accepted clearance that could not be complied with. Entered controlled airspace without the proper clearance.

d. Risk Management/Decision-Making:

Q Accurately completed a safety risk assessment program to mitigate risks. Updated risk analysis throughout the mission and kept the crew informed of changes. Exercised a logic-based, common-sense approach to making calculated decisions on human, material, and environmental factors before, during, and after mission activities and operations. Demonstrated the ability to choose a course of action, using logical and sound judgment based on available information. Effectively incorporated risk assessment, the risk management process, tools, breakdowns in judgment and discipline, problem solving, evaluation of hazards, and control measures.

e. Task Management:

Q Effectively demonstrated the ability to alter a course of action based on new information, maintain constructive behavior under pressure, and adapt to internal and external environment changes. Properly considered establishing priorities, overload, underload, complacency, management of automation, available resources, checklist discipline, and standard operating procedures.

f. Mission Planning:

Q Developed a sound and thorough plan to accomplish the mission. Accounted for all factors applicable to the flight (weather, notices to airmen [NOTAM], landing site data, FLIPs, weight and balance, performance data, fuel requirements, maps current and chummed, etc.) IAW applicable directives. Completed DD Form 175-1 and AF Form 70, as applicable, without significant errors.

g. Briefings and Debriefings:

Q Presented a logical, well organized, and professional briefing in a timely manner. Covered all factors pertaining to the flight and provided effective discussion for accomplishing the mission. Concluded the briefing in time to allow for a thorough preflight of personal equipment, aircraft, and mission equipment. Considered the abilities and limitations of all flight members. Effectively used training aids. Thoroughly and professionally briefed passengers. Thoroughly debriefed the mission, including mission accomplishment, deviations, and lessons learned. Offered correct guidance, as appropriate. Debriefed maintenance personnel as required. ***NOTE:*** If not the briefer or debriefer, actively participated and provided input when required. Fully understood the briefing and debriefing and followed instructions.

Q- Events were out of sequence, redundant, or difficult to understand. Did not effectively use training aids. Focused on nonessential items or omitted minor details. Did not consider flight members' abilities. Had poor time management. Passenger briefing lacked sufficient information. ***NOTE:*** If not the briefer or debriefer, did not fully understand duties and a lack of action or input created minor problems, but did not affect safe mission accomplishment.

U Presentation was disorganized or in an illogical sequence. Created doubts or confusion or omitted major events. Did not allow sufficient time for preflight of personal equipment, aircraft, and/or mission equipment. Ignored flight members' abilities, limitations, and/or questions. Did not brief passengers. Did not debrief mission deviations or offer corrective guidance. Did not debrief maintenance personnel, as required. ***NOTE:*** If not the briefer or debriefer, was late or missed the briefing. Was not prepared or did not actively participate when requested. Did not fully understand duties, and a lack of action or input created problems that impacted safe mission accomplishment.

10. Fuel Management:

Q Updated fuel status at each way point on the navigational route. Determined an updated fuel required and endurance in flight when required to divert, hold, or fuel consumption was more than 50 pounds per hour (pph) greater than predicted on the PPC. Understood and monitored continuation fuels and bingo fuels for each major way point, to include the stage field during contact.

11. Scanning and Clearing:

Q Provided clear, concise, and positive direction to the crew during all phases of flight. Ensured aircraft clearance from obstacles.

II. QUALIFICATION:

12. Hover and Taxi Maneuvers:

Q Performed hover and taxi IAW procedures outlined in the flight manual and Chapter 3. Performed smooth, precise, and controlled aircraft movements. Maintained desired position and ground track ±2 feet, heading ±10 degrees. Taxied at constant speed and altitude of 4 feet (±1 foot). While turning, did not exceed 90 degrees in 4 seconds. Familiar with marshaling signals. Cleared the aircraft.

13. Takeoffs:

Q Performed takeoffs IAW procedures outlined in the flight manual and Chapter 3. Performed smooth, precise, and controlled aircraft movements. Maintained constant ground track and climbout angle. Maintain takeoff heading ±10 degrees below 50 feet. Aircraft was in trim above 50 feet or simulated or real obstacle. Maintained constant airspeed after achieving 70 KIAS ±10. Applied smooth power application and maintained takeoff power ±1 psi. If necessary, takeoff abort was executed in a safe and timely manner as briefed or required without exceeding aircraft limitations.

a. Normal Takeoff. Initiated from the ground or a hover. Applied hover power plus 3 psi and achieved approximately 70 KIAS at 50 feet AGL, but greater than 15 feet by 60 KIAS (see the height-velocity diagram) or as briefed.

b. Marginal Power Takeoff. Initiated at a 3- to 5-foot hover or from the ground. Accelerated without ground contact. Applied no more than hover power. Cleared a 50-foot obstacle down range. Accomplished climbout above ETL without descending below 50 feet and/or the obstacle while accelerating to 50 KIAS.

c. Maximum Performance Takeoff. Initiated at a 3- to 5-foot hover or from the ground. Applied desired power (usually hover power plus 6 psi) smoothly and positively. Cleared a real or simulated 100-foot obstacle. Accomplished climbout without descending below 100 feet and/or the obstacle while accelerating to 70 KIAS.

Q- Had a slight compromise of power requirements.

14. Approaches:

Q Performed the approach IAW procedures outlined in the flight manual and Chapter 3. Performed smooth, precise, and controlled aircraft movements. Maintained constant ground track, approach angle, and aircraft in trim above 50 feet (below 50 feet aligned aircraft with lane or desired landing direction). Descent and deceleration was constant and even (about an apparent brisk walk). If necessary, a go-around was executed in a safe and timely manner as briefed or required without exceeding aircraft limitations. Terminated the approach within 5 feet of intended landing or hover spot. Arrived at or near zero groundspeed on termination of the approach.

a. Normal Approach. Entered at 300 feet AGL and 70 KIAS. Started the descent on an apparent approach angle of 30 degrees. Terminated to hover or touchdown at the desired landing point.

b. Steep Approach. Entered at 300 feet AGL and 30 knots apparent groundspeed. Started descent on an apparent approach angle of 45 degrees. Did not exceed 800 fpm rate of descent. Terminated to touchdown at the desired landing point. Achieved at or near zero groundspeed at intended hover or touchdown spot.

c. Shallow Approach. Entered at 300 feet AGL and 70 KIAS. Started the descent on an apparent approach angle of 10 degrees. Terminated to hover or slide at the desired landing point.

d. Turning Approach (Optional). Entered from any applicable point in the traffic pattern. Executed a continually descending, decelerating turn to align the aircraft with the landing spot. Terminated to hover or touchdown at the desired landing point.

Q- Terminated within 10 feet of intended hover or touchdown spot.

U Aircraft control was erratic, and excessive flare required arresting descent. Consistently undershot or overshot approach angle. Exceeded the 800-fpm descent rate with less than 30 KIAS.

15. Landings:

Q Performed landing IAW procedures outlined in the flight manual and Chapter 3. Performed smooth, precise, and controlled aircraft movements. Maintained constant heading ±5 degrees.

a. To a Hover. Terminated at 3 to 5 feet over the intended spot with no forward speed.

b. To a Touchdown. Maintained a constant rate of descent to touchdown. Touched down with minimal forward speed over the intended spot. Touched down without excessive descent rate and with no side drift.

c. To a Slide. Maintained above ETL until touchdown. Maintained alignment with the landing area. Level touchdown was accomplished at the intended location with minimal rate of descent. ***NOTE:*** Touchdown must occur in the first usable two-thirds of the landing area.

16. Traffic Pattern (Prior to Base Turn):

Event	Q	Q-	U
Airspeed	< ±10 KIAS	< ±20 KIAS	> ±20 KIAS
Altitude	< ±50 feet	< ±100 feet	> ±100 feet

Q Performed traffic pattern IAW procedures outlined in the flight manual and other directives. Performed smooth, precise, and controlled aircraft movements. Maintained a rectangular pattern. Maintained 90 KIAS and 500 feet AGL on downwind and 70 KIAS and 300 feet AGL on base (or per local directives). Conducted a level turn to final on desired heading ±10 degrees. Maintained the aircraft in trim. Cleared the aircraft.

U Did not clear the aircraft.

17. Autorotation:

Q Was familiar with and complied with procedures outlined in the flight manual and Chapter 3. Performed smooth, precise, and controlled aircraft movements. Controlled rotor speed (Nr) throughout the maneuver (294 to 339). Maintained aircraft in trim. If a power recovery during descent was required, initiated in a timely and effective manner without exceeding aircraft limitations. Flared at an appropriate altitude (between approximately 100 and 75 feet AGL). Effected a smooth and controlled power recovery and would have landed safely and in the desired area. Power recovery was no lower than 4 feet. Maintained speed (entry 90 KIAS ±10, descent 80 KIAS ±20, flare 85 KIAS ±15, termination 0 to 15 knots groundspeed). Maintained heading alignment within ±10 degrees during power application.

a. Straight Ahead Autorotation. Entered no lower than 500 feet AGL.

b. Turning Autorotation. Entered no lower than 800 feet AGL.

U Was unfamiliar with or did not comply with established procedures. Aircraft control was erratic or unsafe. Was unable to maintain aircraft position or alignment. Cushion was applied too early or late or in an improper amount. Was unaware of or unresponsive to factors affecting the aircraft. Would not have landed in the desired area.

IIA. QUALIFICATION (Continued). The following will be the grading criteria for all maneuvers listed in IIA of AETC Form 15, including Army maneuvers 18 through 26:

Q Was familiar with and complied with procedures per TC 1-211 for the appropriate task being accomplished. Met or exceeded the requirements for the given task as listed in the Standards and Description sections of each.

III. INSTRUMENTS. General instrument deviation criteria for this section are as follows:

Event	Q	Q-	U
Airspeed	< ±10 KIAS	< ±20 KIAS	> ±20 KIAS
Altitude	< ±100 feet	< ±300 feet	> ±300 feet
Heading	< ±10 degrees	< ±15 degrees	>±15 degrees
Maintaining an Arc	< ±1 nm	< ±2 nm	> ±2 nm

27. Instrument Cockpit Check:

Q Was familiar with and complied with procedures outlined in the flight manual, checklist, and other directives. Ensured required publications were on board.

U Did not use the appropriate checklist or omitted major items.

28. Instrument Departure, Climb, or Leveloff:

Q Was familiar with and complied with procedures outlined in the flight manual, checklist, and other directives. Performed smooth, precise, and controlled aircraft movements. Performed a departure as published or directed and complied with all restrictions. Maintained takeoff power—hover power +5 psi ±1. Maintained accelerative attitude of 5 degrees nose low ±2 degrees. Maintain constant heading ±10 degrees. Aircraft was in trim above 40 KIAS. Maintained a positive rate of climb. Leveled off smoothly at a specified altitude. Promptly established proper cruise airspeed.

29. Use of NAVAIDs and Navigation:

Q Was familiar with and complied with procedures outlined in the flight manual, checklist, and other directives. Ensured NAVAIDs were properly tuned, identified, and monitored. Used appropriate navigation procedures and demonstrated the capability to navigate accurately. Arrived at the fix-to-fix point within 1 mile. Complied with clearance instructions. Was aware of position at all times.

Q- Arrived at the fix-to-fix point within 2 miles.

U Made errors in procedures or use of navigation equipment. Could not establish position. Deviations would have violated airspace or resulted in unsafe maneuver.

30. Holding Procedures:

Q Complied with procedures outlined in the flight manual, checklist, and other directives. Was able to correctly enter and maintain a holding pattern. Was able to estimate winds and makes appropriate corrections. Was able to make timing corrections for very high frequency omnidirectional range station (VOR) holding. Performed smooth, precise, and controlled aircraft movements. Complied with ATC instructions.

31. Precision Approach:

Q Was familiar with and complied with procedures outlined in the flight manual, checklist, and other directives. Was able to fly a precision approach as published or directed. Complied with all restrictions. Made smooth and timely corrections. His or her position would have permitted a safe landing.

a. Instrument Landing System (ILS). Maintained on course and glidepath with no more than momentary deviations 1 dot left or right of LZ course and/or 1 dot below to 2 dots above glidepath and not more than momentary descent below decision height.

b. Precision Approach Radar (PAR) (Optional). Followed controller instructions. Had no more than a momentary descent below decision height.

Q- Courses deviation was ±2 dots; glide slope was 1 3/4 dots below to 2 3/4 dots above.

U Was not in a position for a safe landing. Extended flight below decision height.

32. Nonprecision Approach:

Q Was familiar with and complied with procedures outlined in the flight manual, checklist, and other directives. Was able to fly a nonprecision approach as published or directed. Complied with all restrictions. Made smooth and timely corrections. His or her position would have permitted a safe landing. Had no more than a momentary descent below MDA. Course deviation within ±1 dot; MDA deviation: -50 to +100 feet. ***NOTE:*** The -50 foot tolerance at MDA applies only to momentary excursions.

Q- Course deviation was within ±2 dots; MDA deviation was to -50 to +150 feet. ***NOTE:*** The -50 foot tolerance at MDA applies only to excursions.

U Was not in a position for a safe landing. Extended flight below MDA.

33. Transition to Landing (Optional):

Q Complied with instructions and restrictions. Was able to safely land the aircraft at the termination of an instrument approach in the desired landing area as briefed.

34. Missed Approach or Climbout:

Q Complied with procedures outlined in the flight manual, checklist, and other directives. Adjusted airspeed to briefed climbout airspeed. Executed missed approach or climbout as published or directed.

35. Unusual Attitude Procedures (Optional):

Q Was familiar with and complied with procedures outlined in the flight manual, checklist, and other directives. Was able to recover from an unusual attitude using appropriate procedures.

IV. INSTRUCTOR:

***36. Ability To Instruct:**

Q Reviewed student's present level of training and defined mission events to be performed. Developed a sound plan for accomplishing necessary tasks. Provided a well-organized, thorough student briefing. Planned ahead and made timely decisions. Demonstrated the ability to communicate effectively and offered instruction or suggestions for improvement.

U Failed to assess student's present level of training. Briefings were marginal or nonexistent. Did not plan ahead or anticipate student problems. Was unable to communicate effectively with the student or did not provide corrective actions where necessary.

37. Demonstration of Maneuvers:

Q Was able to effectively demonstrate procedures and maneuvers. Demonstrated a thorough knowledge of aircraft systems, procedures, and all applicable publications and directives.

U Did not demonstrate correct procedures. Had an insufficient depth of knowledge about aircraft systems, procedures, and/or applicable publications or directives.

38. Performance Analysis and Critique:

$\boxed{Q}$ Accurately assessed student performance. Was able to discern problem areas. Correctly identified performance deficiencies or strengths. Was able to provide performance feedback at appropriate times. Was able to reconstruct the flight, offer analysis, and provide corrective guidance where appropriate. Completed all training documents thoroughly and accurately.

$\boxed{Q-}$ Performed some inaccurate assessment of student performance. Failed to discern or misdiagnosed some problem areas. Failed to complete training documents properly.

$\boxed{U}$ Performed an inaccurate assessment of student performance. Failed to discern or misdiagnosed several problem areas. Overlooked or omitted major discrepancies. Provided performance feedback at inopportune times or not at all. Was unable to reconstruct the flight, offer analysis, and/or provide corrective guidance. Failed to complete training documents. Comments in training documents were insufficient to determine student's status and did not reflect actual performance of student.

V. MISSION: (***NOTE:*** Mission evaluations may be conducted day or night. Night evaluations should include NVGs. Accomplish all subareas unless restricted by the environment.)

39. VFR Navigation:

$\boxed{Q}$ Was familiar with and effectively used available aircraft navigational systems. Was able to satisfactorily determine position when map-reading. Correctly analyzed all airspace along route and planned accordingly. Recognized check and turn points. Consistently remained on planned course ±1 mile. Adjusted for deviations in time and course. Updated ETAs at each major way point. Complied with Chapter 3 planning guidance—used proper symbols, posted route on master map, etc. Effectively managed all resources (time, fuel, etc.) applicable to mission execution.

a. Dead Reckoning. Was able to use the principles of time, distance, and heading to determine aircraft position, navigation, and destination.

b. Contour Navigation. Remained within route or area boundaries. Effectively used terrain to determine route, altitude, groundspeed, and aircraft masking.

c. Low-Level Navigation. Was able to use the principles of time, distance, and heading to determine aircraft position, navigation, and destination. Remained within route or area boundaries. Effectively used terrain for masking if available.

d. Terminal Operations. Arrived at target within ±2 minutes.

$\boxed{Q-}$ Arrived at target within ±5 minutes. Was able to regain position orientation in a minimal amount of time. Adapted to missed check and turn points.

$\boxed{U}$ Was unfamiliar with or did not execute maneuvers IAW the flight manual or Chapter 3. Was unfamiliar with and unable to effectively use available aircraft navigational systems. Was unable to satisfactorily determine position when map-reading. Did not recognize check or turn points. Consistently deviated from planned course. Was unable to adjust for deviations in time and course.

40. Low-Level Operations:

$\boxed{Q}$ Was familiar with procedures and able to execute appropriate maneuvers IAW the flight manual and Chapter 3. Performed smooth, precise, and controlled aircraft movements during approach, hovering, and takeoff. Was thoroughly aware of power requirements and limitations. Gave proper consideration and made use of terrain features and wind conditions. If not flying, closely monitored aircraft systems, instruments, and aircraft flightpath and position.

a. En Route. Chose and flew an effective route, altitude, and check and turn points. Flew above the minimum altitude and in an established low-level area.

b. Terminal Operations. Arrived at target within ±2 minutes. Developed an appropriate plan. Was able to adapt to unforeseen circumstances or contingencies.

Q- Arrived at the target within ±5 minutes.

U Aircraft control was erratic or unsafe. Failed to confirm or compute TOLD.

41. Formation:

Q Was familiar with and complied with formation procedures and Chapter 3. Established appropriate formations. Had positive control of flight or element. Was smooth on the controls and had proper wingman considerations. Planned ahead and made timely decisions.

a. En Route. Maintained position with only momentary deviations (For training, 1 to 3 RD for staggered and trail above 500 feet; 3 to 6 RD for staggered and fluid trail during low-level and 500 feet ±100 feet for combat cruise). Made smooth and immediate position corrections. Used radio and visual signals properly. Did not attempt a maneuver that was not briefed. As lead, demonstrated wingman consideration.

b. Lost Visual (or "No Joy") Procedures. Provided concise lost visual and rejoin instructions. Correctly executed applicable actions.

c. Rejoin. Was able to make a smooth, timely join-up without excessive closure rate to the appropriate briefed position. Correctly used visual or radio commands to rejoin. As lead, used no more than 15 degrees angle of bank (±5 degrees). As lead, maintained briefed airspeed (normally 80 KIAS ±5). Maintained safe separation.

d. Terminal Operations. Maintained position with only momentary deviations. Made smooth and immediate position corrections. Maintained safe separation. Maintained 100 feet of separation in taxi. As lead, correctly maneuvered the flight into position for takeoff, established briefed power setting (IGE +3, ±1 psi), and smoothly and correctly established climb (70 KIAS, 500 fpm max). As wingman, maintained position (1 to 3 RD for wing takeoff).

Q- Had some unfamiliarity with procedures or directives. Was occasionally rough on the controls. Made it difficult for the wingman to maintain position. Did not always plan ahead and/or was hesitant in making decisions. Performed some deviations in procedures. Made minor deviations in lost visual procedures and was slow to rejoin. Was slow to provide lost visual or rejoin instructions. Instructions were vague or unclear. Varied position considerably. Overcontrolled.

U Was unfamiliar with procedures or directives. Did not establish appropriate formations. Was rough on the controls. Had little consideration for wingman. Did not plan ahead or was indecisive. Made major deviations in procedures. Did not provide adequate lost visual or rejoin instructions. Instructions or executions were incorrect. Was unable to maintain a formation position. Made abrupt position corrections. Did not maintain safe separation.

42. Remote Operations:

Q Was familiar with procedures and able to execute appropriate maneuvers IAW the flight manual and Chapter 3. Performed smooth, precise, and controlled aircraft movements during approach, hovering, and takeoff. Was thoroughly aware of power requirements and limitations, (TOLD was recomputed if necessary for gross weight or environmental changes.) Gave proper consideration and made use of terrain features and wind conditions. If not flying, closely monitored aircraft systems, instruments, and aircraft flightpath and position. Ensured aircraft clearance from obstacles.

a. Site Evaluations. Effectively assessed landing risk. Evaluated and communicated landing area's obstacles, size and topography, associated winds and turbulence, aircraft's power available or required, and departure route. Maintained approximately 300 feet above the site and a minimum of 50 KIAS during the high reconnaissance. Maintained a minimum of 50 feet AHO and 50 knots during the low reconnaissance.

b. Approach and Landing. Performed a landing IAW procedures outlined in TM 55-1520-210-10 (flight manual) and Chapter 3. Performed smooth, precise, and controlled aircraft movements. Maintained a constant ground track and approach angle. Descent and deceleration were constant and even. Maintained a constant heading during touchdown. Maintained less than an 800-fpm rate of descent when below 30 KIAS. Cleared all barriers by at least 10 feet. Maintained 25 feet of separation from all obstacles in a hover.

c. Departure. Selected and performed takeoff IAW procedures outlined in the TM 55-1520-210-10 (flight manual) and Chapter 3 and commensurate with terrain, winds, barriers, power available, and takeoff restrictions. Performed smooth, precise, and controlled aircraft movements. Maintained a constant ground track, obstacle clearance (10 feet minimum), and climbout angle. Made a smooth power application and acceleration above translational lift. Aircraft was trimmed after a normal climb was established and cleared barriers.

d. Slope Operations. Correctly reviewed slope landing limitations described in TM 55-1520-210-10 (flight manual). Did not exceed a 1-foot drift before touchdown and allowed no drift after skid contact with the ground. Heading remained within ±5 degrees.

Q- Missed minor factors pertinent to the approach, landing, or departure. Evaluation was not tailored to the situation or was excessively detailed and time-consuming. Had confused or disorganized communication with crew.

U Was not familiar or did not comply with procedures. Failed to consider significant details pertinent to the approach, landing, or departure. Was unable to clearly communicate with crew. Aircraft control was erratic or unsafe. Failed to verify that TOLD was computed and/or an adequate power margin existed for the flight conditions.

43. NVG Operations:

Q

a. Preflight. Correctly inventoried the necessary equipment. Correctly inspected and prepared the pivot adjustment shelf (PAS), individual tubes, battery pack, and helmet mount. Used the preflight checklist contained in the appropriate NVG TO. Inventoried the equipment. Inspected the equipment as outlined in the checklist and cleaned parts as required. Completed task before departing for the aircraft. Did not accept substandard equipment.

b. Limitations. Correctly described the limitations for visual acuity and for operations.

c. Malfunctions. Was familiar with the listed malfunctions in the NVG TO. Recognized malfunctions. Executed proper actions at the occurrence of a malfunction.

d. Employment. Complied with guidance in Chapter 3 maneuver and CRM standards while using NVGs.

Q- Missed minor factors pertinent to the performance of the NVGs.

U Was not familiar with or did not comply with procedures. Accepted NVGs that endangered crew survival. Errors or omissions showed a total lack of NGV goggle limitations.

44. Navigation Divert:

Q Correctly determined new heading ±10 degrees. Correctly determined ETE and distance to diversion point ±2 minutes. Determined ETE from the diversion point to nearest recovery base ±2 minutes. Correctly determined fuel requirement ±100 pounds and surplus (loiter time) ±5 minutes. Correctly analyzed and determined if mission could be accomplished, to include payload capability at arrival to destination point. Accomplished mission without undue delay. Adapted available resources to changing situations.

Q- Missed minor factors pertinent to heading, timing, or weight. Had confused or disorganized communication with crew.

U Was not familiar with or did not comply with procedures. Was committed to a mission that endangered crew survival. Excessive delay in computations resulted in an inability to accomplish mission.